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The financial integration of an enlarged EU: Macroeconomic interlinkages

European Investment Bank

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European Investment Bank

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Preface

Ewald Nowotny

Vice-President

All the Accession countries of Central and Eastern Europe have staged an impressive transformation from plan to market and chances are good that a large number of them will be ready to join the EU in the near future. Having said this, it is also true that these countries are still characterised by low living standards – reaching only some 40 percent of the average observed in the current Member States – and that they need inevitably more time to catch up with the West.

Empirical evidence strongly suggests that well-developed financial systems and macroeconomic stability are important factors that determine how fast relatively poor countries can catch up with richer ones. What is more, there seem to be crucial interlinkages between financial sector development and macroeconomic stability. The purpose of this particular edition of the EIB Papers *is to shed light on these interlinkages, taking into account the integration of the financial systems of Accession countries into those of the EU (another edition of the* EIB Papers *– namely Volume 7, Number 1 – looks specifically at achievements and challenges in setting up banking and capital markets in Central and Eastern Europe).*

The questions addressed in this edition are numerous and include: What are the main macroeconomic challenges facing Accession countries and what financial sector implications do they have? What is the outlook for the mobilisation of savings in Accession countries and what does it imply for the region's growth and balance of payments? What are the specific links between the degree of financial sector development and the conduct of monetary and fiscal policies? What are the exchange rate regime options of Accession countries before and after joining the EU and which regime should they choose? Is there an exchange rate regime that is more conducive than others to the steady development of the region's banking sectors? Should adopting the euro be a priority for the Accession countries, and if so, under what time perspective? And, in this context, is there a risk that preparing for EMU entry impedes real economic growth in Accession countries and, if yes, what would be the right policy response to this?

These are absorbing questions that are high on the economic policy agenda, in particular, as these countries are getting ever closer to EU membership. The European Investment Bank has been supporting Accession countries' efforts to prepare for EU membership under successive mandates and pre-accession facilities and, by end-2001, had committed about EUR 16 billion for projects in the region. While the Bank has no remit to participate in the macroeconomic policy debate, it is clear that we must have a thorough grasp of the underlying issues to ensure the effectiveness of our support for productive investment. I am convinced that the research pulled together in the EIB Papers *has been very successful in this respect.*

The financial integration of an enlarged EU: Macroeconomic interlinkages

A conference aimed at reviewing financial system developments in the Accession countries of Central and Eastern Europe (CEEC), as well as drawing policy conclusions arising from further integrating the CEEC financial systems with those of the EU, was held at the EIB on 17 January, 2002. The conference looked at achievements and challenges in setting up functioning banking sectors, provided an EU banker's strategic view of banking in the region, examined capital market trends, and discussed exchange rate policy options for the Accession countries.

Speakers included:

Willem Buiter,
of the EBRD, London

Paul De Grauwe,
of the Katholieke Universiteit Leuven

Jan Hanousek,
of CERGE, Prague

Ricardo Lago,
of the EBRD, London

Armin Riess,
of the EIB

Eva Thiel,
of the OECD, Paris

Robert Feldman,
of the IMF, Washington

Erich Hampel,
of Creditanstalt, Vienna

Jens Köke,
of ZEW, Mannheim

Philippe Maystadt,
President of the EIB

Michael Schröder,
of ZEW, Mannheim

Éva Várhegyi,
of Financial Research Ltd, Budapest

EUROPEAN INVESTMENT BANK

Editors' comment

There is substantial empirical evidence that well-developed financial systems play an important role in promoting stable long-run economic growth. At the same time, there does not seem to be strong evidence that the structure of the financial system - i.e. the relative weights of capital market finance, on the one hand, and bank finance on the other - matters for growth and development. Countries can prosper with an emphasis on either capital market or bank finance, but it is clear that they need a good dose of both.

Against this background, the development of financial systems of accession countries in Central and Eastern Europe and their smooth integration with those of existing EU members is an important economic policy issue. Both editions of this year's *EIB Papers* are devoted to this issue. This edition takes a look at linkages between financial sector development and macroeconomic performance. The other edition (Volume 7, Number 1) focuses on accession countries' achievements and challenges in creating functioning banking sectors and capital markets. That edition also features an editors' introduction, which leads into the theme and provides an overview of the papers in both editions. The papers contained in Volume 7, Number 1 are:

Practice makes perfect: A review of banking in Central and Eastern Europe
Armin Riess (EIB), Rien Wagenvoort (EIB) and Peter Zajc (University of Ljubljana)

The Czech Republic's banking sector: Emerging from turbulent times
Dana Hájková, Jan Hanousek and Libor Němeček (CERGE-EI, Prague)

Hungary's banking sector: Achievements and challenges
Éva Várhegyi (Financial Research Ltd., Budapest)

Slovenian banks a decade later
Peter Zajc (University of Ljubljana)

Successful banking in an enlarged EU
Erich Hampel (HVB Group Bank Austria, Vienna)

The future of Eastern European capital markets
Jens Köke and Michael Schröder (ZEW, Mannheim)

Armin Riess and Rien Wagenvoort

The financial sector, macroeconomic policy and performance

Robert A. Feldman

Nancy Wagner

1. Introduction

A healthy and developing financial sector is a key support to balanced and sustainable economic growth. And as the countries of central Europe –the Czech Republic, Hungary, Poland, Slovakia, and Slovenia– approach EU membership and ultimately adoption of the euro, the litmus test for financial sector performance will be its success in supporting such growth and the process of convergence to EU income levels.

But with the financial sector at the crossroads of the macroeconomy, it not only has immense potential to invigorate and broaden economic growth, it can also impair macroeconomic policy and stability. From the standpoint of transition, this is perhaps most evident in the fact that successful reform of the banking sector is a necessary condition for fiscal and monetary stabilization. A well-functioning banking sector can go far in containing quasi-fiscal losses and avoiding the soft budget constraints of the past. Meanwhile, underdevelopment and vulnerabilities in the banking system, and the financial sector more generally, can complicate the conduct of monetary policy, seriously limit the policy choices both in day-to-day operations and in response to external shocks, and impede the development of a reasonably predictable and effective monetary transmission. And in the run-up to EU accession and monetary union –a setting that is likely to be characterized by large, and possibly volatile, capital inflows– the importance of a healthy banking system with effective supervision, regulation, and risk management cannot be overemphasized: it is key to mitigating potential financial vulnerabilities associated with intermediating capital inflows of sizeable magnitude.

Empirical evidence has shown convincingly that countries with better-developed financial systems enjoy substantially faster and stable long-run growth. In the context of transition, foreign direct investment (FDI) will, of course, remain a central component of the growth process, including through the transfer of technology and management skills. But if a dual economy is not to take hold, domestic financing needs to mature and expand –and most importantly for viable enterprises, including small- and medium-size enterprises that engender entrepreneurship and innovation, that do not have access to international capital markets. The regulatory framework is important here. Sound financing requires, for example, a judicial framework within which collateral for lending is clearly defined, easily advanced, and securely realized in case of default. And appropriate securities, insurance, and pension regulation and reform can set the stage for a growing role of securities-based intermediation.

Many of the financial sector challenges facing the central European countries (hereafter referred to as the CEC5) are similar to those in existing EU members –but there is a particular need for institutional deepening and, to varying degrees, addressing residual legacies of the past. Slovakia

Robert A. Feldman is Chief of the Central European Division II at the IMF. Nancy Wagner is a Senior Economist in the same Division. *The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy. The paper draws heavily on recent work at the Fund concerning policy frameworks in central Europe, distributed as a collection of papers entitled "The Road to EU Accession" (see Feldman and Watson, 2001) which is to be revised and published by the IMF later this year as a book. Within that publication, see especially Wagner and Iakova (2001).*

and the Czech Republic suffered from weak banking sectors until recently, but are now engaged in major efforts to ensure a healthy financial structure. They have recently privatised the remaining state-owned banks –and made explicit quasi-fiscal costs, but completing the bad debt workout still lies ahead. Slovenia still needs to privatise its largest state-owned banks and move away from an oligopolistic banking structure. Hungary and Poland have the most advanced financial systems, but face increasing competition– which will narrow margins, impact profitability, and spur consolidation.

These pressures are becoming increasingly evident across the region, and will intensify as all five countries enter a common market for financial services. Adequate regulation and supervision will be essential to avoid excessive risk-taking, particularly in the presence of heavy capital inflows that can jeopardize financial and macroeconomic stability. In all five countries, the legal system and judiciary need to be strengthened in areas such as collateral enforcement, which provide key underpinnings to financial sector activity.

In exploring the inter-linkages between the financial sector and macroeconomic policy and performance in more detail, this paper charts the following course. Section 2 takes stock of the banking sectors of the five countries. This is followed in Section 3 by a discussion of some of the macroeconomic complications that can arise during the convergence process, with a view to discussing the associated implications for the financial sector. Recognizing that the relationship between the financial sector and macroeconomic policy is a two-way street, Section 4 turns to the issue of how the financial sector supports fiscal and monetary policies, as they deal with the macroeconomic complications that are identified. It emphasizes that, simultaneously, the growth and development of the financial sector also depends critically on sound monetary and fiscal policies, which lay the macroeconomic groundwork for stable financial conditions. Various measures to enhance financial stability are summarized in Section 5, before providing concluding remarks in Section 6. While the focus of this paper is on central Europe, the intent also is to provide material and analysis that is of sufficiently general interest to apply to other transition countries as well.

Given where they came from, accession countries have made major strides in setting up market-driven banking systems ...

2. Taking stock

More than a decade into transition, the banking systems in the CEC5 share a number of characteristics (see Table 1). Some of the main points include:

- Most of the CEC5 have made considerable progress in improving the quality of banking portfolios. In particular, both Hungary and Poland have seen sharp reductions in the share of classified loans, although Poland's share rose again in 2000. In the Czech Republic and Slovakia, the large share of non-performing loans and persistent negative average returns –at least until recently– pointed to a need for significant restructuring, which is now well underway. Most of the non-performing assets have been transferred to consolidation banks, and the remaining issue is how to dispose of those assets given the weaknesses of insolvency regimes.
- The efficiency of financial intermediation has room for further improvement. Net interest margins are higher than the EU average, reflecting higher spreads between deposit and lending rates. Corporate margins have been steadily declining, but those on household lending have increased substantially as this portfolio has grown and lenders have required a higher return to compensate for the greater risk.

- Competition, however, has strengthened as evidenced by declining intermediation spreads, a shift in bank portfolios from government securities to private sector lending, and declining bank profitability. Moreover, with the blue chip market saturated in some of the CEC5, lending to small- and medium-size businesses is on the rise. While these factors may increase risk, they also indicate that banks are increasingly playing their appropriate role of intermediation. The inroads of new information technology, competition from capital markets and inflows, and EU integration should all make the banking sectors of the CEC5 subject to increasing competition. Against this background of falling margins and needed heavy investment in information technology, banks in the CEC5 can be expected to struggle to maintain profits.

- Concentration in the banking sector is high. There is a particularly strong concentration of deposits, while the credit market is somewhat more fragmented. In the competitive setting outlined above –and taking into account some initial over-investment by foreign and domestic parties– pressures on profitability can be expected to spur further consolidation across the sector. Mergers among parents of foreign banks are likely to remain a driving factor behind consolidation in the CEC5 (e.g., the merger between Bank Austria Creditanstalt and Germany's Hypovereinsbank, both of which already had an important presence in the CEC5, was a first step in this direction). However, high concentration may even be desirable given that upon EU accession, larger banks may be better placed to compete successfully.

... and privatisation to foreign strategic investors has been instrumental.

In bringing these changes, the rapid reduction in the state ownership of the banking sector has been a key factor. Privatisation of the banking sector has been largely completed in most of the CEC5, though they followed quite different approaches (1).

Hungary's policy was to sell controlling shares in state-owned banks to strategic foreign investors as rapidly as possible, with more than 60 percent of assets now held by foreign investors. The remaining share of state-owned banks is now only about 12 percent of assets, most of which is concentrated in one bank (Postabank). The foreign parents brought with them skills for credit evaluation, risk management, and more sophisticated financial instruments, which increased knowledge and the efficiency of the banking sector as a whole. Currently, Hungary has one of the most modern and advanced financial systems among the transition economies (2).

In contrast, the voucher privatisation in the Czech and Slovak Republics left controlling ownership of the largest banks with the state. Banks assumed ownership stakes in their voucher-privatised clients, which led to continued soft lending practices and repeated bailouts. This magnified problems with connected lending and non-performing loans, complicating efforts to find strategic foreign owners in the absence of cleanups or guarantees. Moreover, persistent political interference in the banking system depressed foreign investor interest. Recently, however, the environment has changed. The bad debts have now been recognized and have been –or are in the process of being– transferred to consolidation banks in their respective countries, and privatisation has been largely completed, with foreign shares in total assets in excess of 80 percent, the highest in the CEC5.

1) Slovenia has maintained a high share of state ownership in the banking sector, resulting in an oligopolistic banking structure with limited competitive pressures. Foreign ownership remains quite limited. However, Slovenia passed a new banking law in 1999 that allows foreign banks to open up branches and permits foreign investors to purchase up to a 10 percent stake in Slovene banks. The authorities have recently started the process of privatizing the two state-owned banks.
2) Szapáry (2001) reviews the experience with banking system reform in Hungary.

Table 1. Banking sector statistics

	Czech Republic			Poland			Slovakia			Slovenia			Hungary		
	1998	1999	**2000**	1998	1999	**2000**	1998	1999	**2000**	1998	1999	**2000**	1998	1999	**2000**
Number of licenced (commercial) banks	45	42	**42**	83	77	**73**	25	23	**21**	24	25	**25**	37	36	**33**
of which															
Majority state owned (number)	5	4	**4**	13	7	**7**	5	5	**4**	2	2	**2**	2	2	**...**
As % of total assets	23.2	23.2	**...**	48.0	23.9	**22.9**	50.0	47.1	**...**	39.7	40.0	**40.3**	11.8	...	**...**
Majority foreign owned (number)	13	14	**18**	31	39	**46**	11	10	**10**	3	5	**5**	27	...	**...**
As % of total assets	15.5	26.8	**...**	16.6	47.2	**69.6**	28.9	30.2	**...**	4.9	4.8	**15.6**	61.4	65.4	**66.7**
Number of banks accounting for:															
25% ot total assets	2	2	**...**	2	2	**2**	2	2	**2**	1	1	**1**	2	2	**...**
Asset share of the 3 largest banks	...	...	**...**	...	...	**...**	45.6	45.8	**...**	52	52	**50**	40	38.5	**...**
Asset share of the 5 largest banks	66.2	63.2	**59.1**	42.9	47.7	**46.7**	...	...	**...**	64	64	**62.5**	50.8	50.8	**...**
Total bank assets as % of GDP (excl. Central Bank)	174.0	181.3	**...**	58.0	59.4	**62.3**	111	100.4	**95.5**	72.2	78.7	**79.1**	68.6	67.8	**65.2**
FX denominated assets (as % of total)	19.9	21.5	**...**	...	...	**...**	...	16.0	**18.3**	29.7	30.2	**32.8**	36.1	37.0	**36.4**
FX denominated liabilities (as % of total)	18.2	18.3	**...**	15.2	17.5	**18**	16.2	16.2	**17.4**	30.6	31.2	**34.1**	36.9	36.1	**36.5**
Contingent and off-balance sheet accounts (as % of total)	78.2	81.0	**...**	52.6	74.5	**153.3**	...	...	**...**	32.3	35.1	**37.3**	44.1	38.8	**40.8**
Average lending spread (lending - deposit rate)	4.7	4.2	**...**	6.3	5.8	**...**	6.5	5.1	**4.4**	6.2	6.3	**6.4**	3.1	3.1	**3.0**
Non-performing loans (as % of total loans) (overdue 30 or more days)	26.4	32.1	**29.5**	10.9	13.7	**15.3**	31.7	23.7	**15.2**	10.4	11.5	**12.6**	10.4	8.8	**7.9**
Risk-weighted capital/asset ratio (in percent)	12.1	13.7	**14.9**	11.7	13.2	**12.9**	6.7	12.6	**12.5**	16.0	14.0	**13.5**	16.5	14.9	**13.5**

Sources: Data provided by desks; EBRD Transition Report; NBP, "Summary Evaluation of the Financial Situation of Polish Banks, 2000"; NBH, "The Hungarian Banking Sector, 2000"; Bank of Slovenia.

Poland's approach to restructuring resulted in the lowest overall fiscal cost among the CEC5. In the early 1990s, a bank-led enterprise restructuring program was implemented using debt-equity swaps through which banks acquired ownership stakes in their financially weak clients. The government attempted to minimize explicit guarantees and create incentives for market-based work-outs, which took place in the mid-1990s. In the last few years, Poland has attracted significant strategic foreign investment, and given the high proportion of foreign ownership of the share capital of banks with dispersed ownership, banks controlled by foreign capital effectively had a market share of about 70 percent by 2000.

Box 1. Economic growth and the financial sector

Well-developed banking systems and financial markets can have a significant positive impact on long-run growth, including through mobilizing and reallocating savings; facilitating the hedging, diversifying, pooling and trading of risk; and strengthening corporate governance in the enterprise sector. In view of the dominance of banks within the financial sectors of the CEC5, an important question is whether the type of financial system matters for growth. But empirical analysis of market-based versus bank-based financial systems has found no conclusive evidence that either type of system is preferable. While the presence of both types of financing can also allow for better diversification and risk sharing, more important than the debate on type of system is the recognition that effective and well-supervised financial structures can contribute significantly to achieving rapid and sustainable growth.

Over time, improving access to financing for households and SMEs–and fostering entrepreneurship and innovation through this avenue–will be an important element of supporting growth in the CEC5. When the financial sector is underdeveloped, it is primarily the smaller borrowers that suffer from inadequate financing. These more risky market segments still have only limited access to financial markets in the CEC5. These markets have recently, however, started to expand as banks–facing increasing competition for blue chip corporate loans–seek to broaden their client base in the underserved markets for mortgage lending, household loans, and SME financing. As this occurs, investment in housing and in fixed assets of firms should increase, while households' savings may tend to level off or decline as they become increasingly leveraged.

These market segments are, however, particularly prone to problems of asymmetric information–making risk assessment difficult for intermediaries. Asymmetric information can lead to adverse selection, moral hazard, principal-agent problems, and financial contagion, all of which can undermine efficiency and result in financial vulnerability. Banks are likely to remain of paramount importance for these smaller borrowers, since banks have a comparative advantage in screening projects and monitoring clients, mitigating problems of asymmetric information. Thus, one way to support development in these markets is to improve (and, in many cases, create) interbank information systems that can provide reliable and timely data on consumer and commercial credit information, including loans outstanding, collateral registers, past debt defaults, etc. These markets can also be supported by strengthening the legal framework, especially as regards creditor rights, bankruptcy laws, and recovery of collateral. Resort to government intervention –providing public guarantees for SME loans or subsidizing mortgage lending– should, however, be kept to a minimum. Such approaches can ultimately put pressure on the fiscal accounts and impede the healthy development of a fully market-based financial system.

Bank lending is often seen as the lowest cost (and perhaps only) financing source for SMEs with limited track records, while securities markets are sometimes viewed as the more cost-effective source for large, well-established firms. However, venture capital firms could find a firmer foothold in these economies through providing finance for new enterprises undertaking high risk, high return projects. This is due to the risk-sharing features of venture capital firms as opposed to bank creditors. Banks typically charge a pre-determined rate of interest and do not benefit from excess returns to successful high-risk projects. On the other hand, venture capital firms, as part equity holders, do share the benefits of the upside returns, and their losses are limited to their stake in the new enterprise. Indeed, the success of venture capital firms in Hungary suggests that, given a stable macroeconomic environment and strong legal system, venture capital may provide a viable source of funds for small entrepreneurs.

While the financial sector is clearly important, the policy implication of all this is not that the financial sector, by itself, can ensure the desired growth outcome. Also required are a combination of macroeconomic stability to support private investment, appropriate labor market policies that encourage a growing and productive labor force, and structural reforms that enhance growth potential. But a well-functioning and healthy financial system helps to allocate savings to the most productive investments and can contribute significantly to sound corporate governance.

Allowing reputable foreign banks to enter the domestic market has encouraged innovation and competition, while underpinning institutional soundness. Foreign owners often bring stronger corporate governance to the market, as well as more sophisticated risk management systems. While there are cases of longer-established foreign investors taking a passive approach and benefiting from high local margins, more typically they spur competition and render the sector more efficient –introducing new skills, products and technology. More intense competition leads to lower profits, and puts pressure on all banks to reduce costs. This prepares domestic banks to cope with competition in the single market after accession. The presence of reputable foreign banks may also reduce the risk of capital flight or widespread depositor runs, as they may be seen as more immune from a crisis in the domestic banking system.

In sum, the benefits of foreign ownership are well recognized and now seem to be well accepted. But, as exemplified by the experience with IPB in the Czech Republic (3), privatisation to foreign investors is not a panacea: appropriate incentive and supervisory structures need to be in place to ensure soundness.

3. Macroeconomics challenges and their implications for the financial sector

The importance of a healthy and well-regulated banking sector cannot be overemphasized in an environment of liberalised capital accounts ...

A key challenge is to avoid macroeconomic imbalances and vulnerabilities that can arise and thwart the growth process (see Box 1 for a discussion of economic growth and the financial sector). Thus, this section addresses the following question: as convergence advances on the road to EU accession and monetary union, what potential macroeconomic complications are cause for concern and, in this context, what are the financial sector implications? Coping with large, and potentially volatile, capital inflows is one critical concern. In recent years, the improving economic prospects and speculation on interest rate convergence have already led to a steady increase in capital inflows–including short-term debt and portfolio investment, which are most easily reversible (4). Another crucial issue is the higher investment needed to facilitate convergence and the considerable uncertainty regarding saving behaviour to finance such investment–thus raising the spectre of large current account deficits and external vulnerability, which would only be accentuated by weak banking systems.

Capital Inflows

Inflows are likely to be very sensitive to the perceived sustainability of policies in the run-up to accession. Contagion effects through trade and financial channels are also likely to intensify as the CEC5 increasingly compete in their main export markets and complete the liberalization of their capital accounts. Temporary surges in inflows during periods when interest rates are bid down

3) The case of Investicni a Postovni Banka (IPB) is discussed in Box 2 of Wagner and Iakova (2001).
4) Even FDI, which is typically viewed as the most stable form of capital inflow, could be increasingly vulnerable to reversals, since a growing proportion of FDI is coming in the form of inter-company loans and retained earnings.

toward euro zone levels can be quickly reversed once arbitrage opportunities disappear. A heavier reliance on the securities markets, in itself, may increase the vulnerability of capital flows to shifts in expectations and asset price volatility.

The benefits of capital flows are many, and liberalisation of the capital account can spur greater competition in the financial sector. Nevertheless, large capital inflows –if these flows are greater than the recipient economy's ability to absorb them– can have a potentially negative impact on the financial sector and, ultimately, the real economy. Large capital inflows have been associated with rapid credit expansion and riskier lending practices in emerging markets. Short–term inflows are often driven by speculative considerations –exploiting an interest rate differential and/or expectations on the direction of exchange rate movements– and can be easily reversed if expectations change (5). Moral hazard distortions –such as an implicit exchange rate guarantee or expectations that the government would bail out the banking system– can also underpin short-term flows. Such flows have been responsible for many of the boom-bust cycles in emerging markets in the 1990s, as they are also the first to head for the exits at any signs of economic or financial distress. Heavy inflows can also lead to excessive real exchange rate appreciation, potentially eroding competitiveness and widening current account deficits, and resulting in a deterioration in performance of some of the banks' clients, with possible negative repercussions on debt repayments.

... and is instrumental in mobilising domestic savings, thus promoting economic growth and macroeconomic stability.

Particularly in the case of a relatively fixed exchange regime, heavy inflows can result in currency (and maturity) mismatches for the financial sector's assets and liabilities. If the fixed exchange rate regime is credible, there can be a shift toward foreign borrowing at lower interest rates, leading to large open foreign exchange positions for banks. This directly links the health of the banking system to the survival of the fixed exchange rate regime and increases the probability of speculative attacks. However, a robust financial system should reduce the likelihood of speculative attacks, since a strong system is known to be able to withstand an aggressive policy response.

More flexible exchange regimes –to which the countries of central Europe have now moved– allow more transparently for two-way risk, which can limit excessive foreign currency exposures and liquidity mismatches. Exchange rate volatility will change the incentives regarding hedging, naturally spurring the development of markets for hedging instruments. Nevertheless, a floating exchange rate regime does not prevent speculative inflows –there can still be excessive borrowing abroad if, for example, there are strong expectations of appreciation that are not fully reflected in the interest rate differential. Sufficient fiscal consolidation can relieve monetary policy of the burden of attempting to curb inflationary pressures with excessively high interest rates, which ultimately may attract capital inflows and create an unsustainable current account deficit. A premature opening of the capital account –against a background of immature financial markets and incomplete structural reforms– may magnify any underlying macroeconomic and structural weaknesses and heighten the risk of bank failures.

Capital controls have been progressively eased in the CEC5 in recent years, in part owing to OECD membership requirements for some of the countries and also as a result of EU Accession commitments. Most of the CEC5 have largely liberalized their capital accounts, although Poland

5) To the extent that EU membership leads to a higher degree of synchronization of macroeconomic performance and financial asset price movements between the CEC5 and other EU countries, there could be a stimulus for portfolio capital flows to leave the CEC5 in favor of other emerging markets (including some of the other transition countries) as investors try to maintain the desired diversification of their portfolios between assets with different yield-risk combinations.

and Slovenia continue to maintain a few controls. Upon accession, remaining controls will have to be removed –in the absence of derogations– potentially stimulating further capital inflows.

Fundamentally, while sound policies cannot be substituted by capital controls, to some degree speculative attacks unrelated to macroeconomic fundamentals can be considered as a form of market imperfections and there is a plausible case for the retention or reimposition of capital controls to counter these. In a situation of incipient major capital inflows or reversals that appear unrelated to policy slippages (for example, convergence plays or contagion effects), there may be a case for reintroducing capital controls on a strictly temporary basis (6). While the risks associated with many financial inflows can be reduced (but not eliminated) with sound financial institutions and well-functioning prudential supervision and regulation, in circumstances in which these are not fully in place, capital controls can be a supplementary tool to buttress prudential regulation and limit excessive risk taking.

Strengthened prudential supervision and regulation will be key as capital account liberalisation continues.

Effective regulation and supervision –that is, a sound legal framework not only on the books but also well implemented in practice– can provide the best insurance against capital inflows being intermediated through banks that are poorly equipped to deal with them. Strengthened supervision and regulation will be key as capital account liberalisation continues in a setting of high (and variable) capital inflows. In addition, financial market imperfections associated with asymmetric information (e.g., moral hazard, adverse selection, and herding behavior) –which can be magnified by an open capital account– can be limited by putting in place a bankruptcy framework that ensures budget constraints on enterprises, minimizing explicit and implicit government guarantees, and improving the integrity and availability of financial information as well as the corporate governance structure of financial institutions.

Investment and domestic savings

At the start of the transition more than a decade ago, investment-to-GDP ratios in the CEC5 bottomed out, in line with the drop in output (Figure 1). Moreover, much of the capital stock at that time became obsolete overnight. In the aftermath, investment rebounded, as the CEC5 struggled to transform their economies into market-oriented ones. This transformation continues today, as part of the process of real convergence, and investment ratios may have to rise further to maintain strong economic growth. This would include public investment, too, with needed infrastructure development and accession-related investment.

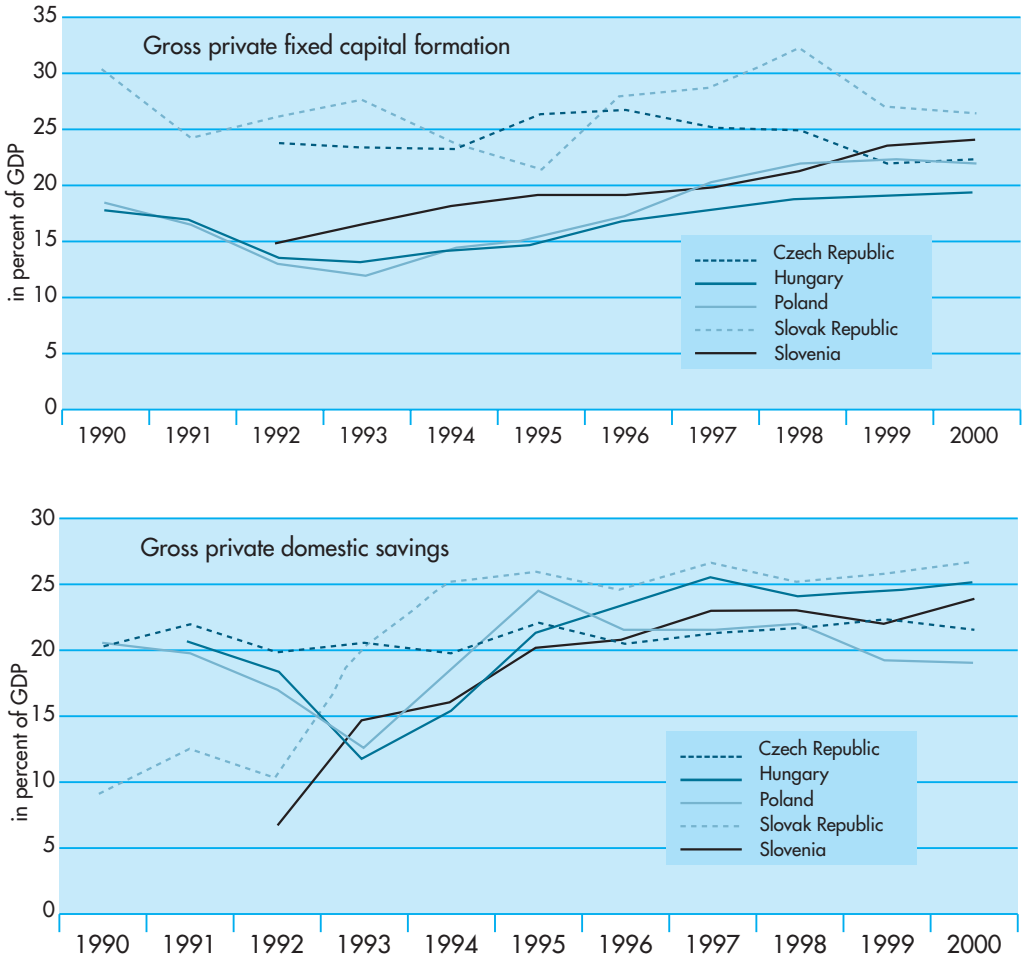
While capital inflows and, in particular FDI, will be crucial in supporting these countries' higher investment needs, domestic financial markets, through their intermediation and governance functions, will also be important in underpinning investment and for realizing growth potential. As amply demonstrated by the CEC5 prior to transition, heavy investment in fixed capital alone was not enough to ensure strong and sustainable economic growth; investment ratios were high in the 1980s, but TFP growth was lackluster, reflecting inefficiencies in investment decisions and fundamental misallocations of capital.

6) The safeguard clause of the Maastricht Treaty allows countries to introduce temporary restrictions, including on capital movements, in the case of serious balance of payments difficulties. These restrictions can be introduced overnight, but must subsequently be sanctioned by the Council. There may be instances in which this safeguard can be activated for countries wanting to prevent surges in capital inflows in order to avoid serious external difficulties, but the conditions under which this might be permitted, if at all, have not been tested for the CEC5.

It is in this respect that well-functioning financial markets help to ensure efficient and productive capital allocation, which also translates into faster Total Factor Productivity (TFP) growth. Indeed, Doyle, Kuijs, and Jiang (2001) highlight the key role of TFP growth in the most successful of the CEC5. Interestingly, the three countries –Hungary, Poland, and Slovenia– in which TFP contributed substantially to growth in the 1990s, also had lower investment ratios than the Czech and Slovak Republics, for which the TFP contribution was negligible. At the same time, the latter two countries had the least healthy financial sectors, heavily burdened by non-performing loans, and thereby incapable of fully playing the needed intermediation role.

In most of the countries, saving rates followed a pattern somewhat similar to that of investment ratios (Figure 1). They registered a marked drop at the start of transition, followed by a rebound. However, the rebound in saving still could not fully compensate for the sharp rise in investment, with foreign saving filling the ensuing gap associated with the current account deficit.

Figure 1. Gross capital formation and gross domestic saving.



Box 2 discusses the factors likely to influence the saving rate in the region. It suggests that the prospects are highly uncertain for substantially greater private domestic saving to meet the forthcoming investment demand, as many of the factors affecting private saving rates have offsetting effects. However, the offset in household saving owing to a rise in public saving is likely to be incomplete. Thus, a permanent increase in public saving would raise national saving. In addition, reforms of the tax system and public expenditure could be conducive to raising the private saving rate. Callen and Thimann (1997), for example, found that high income taxes and a heavy reliance on government transfers is associated with low saving. Other studies (e.g., Ul Haque *et al.*,1999; Masson *et al.*, 1995) have also found that, for a given fiscal balance, a reduction in the current expenditure-to-GDP ratio tends to increase the private saving ratio. The empirical literature also suggests that expenditure-driven fiscal consolidation tends to increase private investment (and thereby support growth over the longer term), but the net effect on the private saving-investment balance is uncertain. Fiscal consolidation based on higher taxes, however, would be expected to significantly lower both private saving and private investment.

Fiscal policy needs to have a built-in degree of flexibility to counterbalance potential saving-investment imbalances.

Overall, in view of the uncertainties regarding saving and investment behaviour, fiscal policy needs to have a built-in degree of flexibility to counterbalance potential saving-investment imbalances and the vulnerability implied by large external current account deficits. In particular, expenditure-based medium-term fiscal consolidation might minimize the risk of potentially having to rely on excessive foreign financing to cover any saving-investment imbalance and, at the same time, set the stage for stronger long-term growth (7). And a weak financial sector can heavily constrain the flexibility and effectiveness of fiscal and monetary policy, and shift the policy emphasis away from long-run growth.

4. The financial sector and fiscal and monetary policies

Completing the reforms should facilitate the tasks of macroeconomic policy, e.g. by recognising and/or reducing quasi-fiscal losses, removing constraints on interest rate movements, and enhancing the effectiveness and predictability of the transmission mechanism. On the fiscal side, significant contingent liabilities–either related to the banking system or embedded in soft lending to enterprises–prevent credible fiscal planning, divert resources from productive investments, and may lead to debt sustainability issues. On the monetary side, the monetary authorities may be unwilling to tighten policy if that would threaten the health of financial intermediaries. More broadly, an underdeveloped financial system weakens the predictability of monetary transmission, thereby complicating the conduct of policy.

Fiscal policy issues

In view of the large share of insolvent banks at the start of transition, government intervention was unavoidable to provide a clean start for financial institutions and to remove incentives for risky behaviour. The state-owned banks in the CEC5 faced large volumes of non-performing loans –a legacy of central planning and directed lending– as they began the transition process. The cost of bank restructuring can be high, as shown in Table 2 for a selection of both emerging markets and industrial countries. In each of the CEC5, bank re-capitalisation required substantial fiscal resources in the early 1990s, and, in the case of the Czech and Slovak Republics, continues to have significant fiscal implications (8). Government involvement in bank re-capitalisation and restructuring has often

7) Christou and Daseking (2001) provide an in-depth discussion of choosing appropriately flexible medium-term fiscal strategies for the CEC5.

8) The IMF recently estimated the cost of cleanup in the Czech Republic at 15 percent of GDP over the 2001-2004 period. The estimate for the restructuring in the Slovak Republic, which took place in 2000, is about 12 percent of 2000 GDP.

Box 2. The outlook for savings in Central Europe

Saving reflects the choice between current and future consumption, and a key question is whether the saving rates in these countries will rise or decline as the economies become richer during the convergence process. Empirical evidence is mixed as to whether growth and saving are positively or inversely correlated. Many empirical studies indicate a positive correlation between per capita income and private saving rates, but this positive relationship is notably more evident in developing countries than in advanced economies (Masson *et al.*, 1995).

Other studies suggest that saving is primarily determined by intertemporal consumption smoothing (as in the permanent income hypothesis), which would predict a lower saving rate as private agents increase consumption now on expectations of higher income in the future. But uncertainty and liquidity constraints might play a significant role in preventing the full intertemporal smoothing of consumption and, hence, to a rising saving rate as income increases. In the case of the CEC5, however, the recent liberalization of financial markets and the steadily increasing access to credit for the domestic private sector in some of the CEC5 might argue for a declining saving rate, as liquidity constraints are eased.

More broadly, the impact on private saving of financial liberalization can be somewhat ambiguous. Clearly, the easing of liquidity constraints would likely reduce saving, but the wider array of instruments for financial saving would usually drive real interest rates on deposits higher, making saving more attractive than current consumption (substitution effect). For the CEC5, the easing of liquidity constraints is likely to dominate. In fact, Rodrik (2000) estimated that a 1 percentage point increase in the ratio of private credit to income lowers the long-term private saving rate by 0.74 percentage points.

Moreover, macroeconomic stabilization (and the easier access to credit) has lowered the uncertainty for private agents in CEC5, and consequently reduced the need for precautionary saving. These factors –and pent-up demand in the wake of the sharp drop in real incomes at the start of transition– could, therefore, point to a declining household saving rate in the CEC5 in the near to medium-terms.

Rising corporate profitability could, however, offset an expected decline in household saving. Indeed, high profits, on the back of strong productivity growth, have been a driving factor in preserving the private saving rate in the CEC5. But the rapid growth in business profits may well be curbed in the future by a limited supply of qualified labor in conjunction with continued strong domestic and foreign investment.

Jiang (2000) performs an econometric analysis to examine the possible impact of a number of determinants on private saving rates in the CEC5 and Estonia. The dependent variable in the regressions is the ratio of gross private saving (including both household and business saving) to GDP. Among his findings, growth had a negative effect on saving rates, but relative per capita income (measured in purchasing power terms relative to the United States) exhibited a strong and positive effect. The ratio of private sector credit to GDP (a rough proxy for financial liberalization) had the expected negative impact on the saving rate. Meanwhile, about half of any increase in government saving was expected to be offset by a decrease in private saving.

reflected substantial fiscal or quasi-fiscal transfers to banks, adding to the public debt and, through higher interest payments, restricting the flexibility of fiscal policy.

Nevertheless, there is no valid economic reason for delaying bank restructuring and, in a macroeconomic context, concern about the impact of a widening fiscal deficit that results from bank re-capitalisation and restructuring is often misplaced (9). The demand impact of re-capitalisation is usually fairly small, and delays or incomplete restructuring have proven to magnify the problem, ultimately leading to a higher present discounted value of government liabilities. From the standpoint of fiscal policy, most important is putting in place an incentive structure that minimized the need for further intervention–to avoid increasing the future tax burden and impairing the flexibility of fiscal policy to stabilize the economy and play its growth-enhancing role (10).

Monetary policy issues

Monetary policy in the CEC5 will still be confronted with several challenges until the financial markets mature more fully. In particular, the monetary transmission mechanism may not be fully understood. This is especially critical now, with most of the CEC5 having recently moved to an inflation targeting framework for monetary policy.

Table 2. The cost of bank restructuring in selected countries

	Country		Percent of GDP
Latin America	Argentina	(1980-82)	55
	Chile	(1981-83)	41
	Uruguay	(1981-84)	31
	Venezuela	(1994-95)	20
	Mexico	(1994-95)	20
	Brazil	(1994-96)	5-10
Asia	Thailand	(1997-)	42
	Indonesia	(1997-)	50-55
	Korea	(1997-)	34
Transition countries	Bulgaria	(1990s)	14
	Czech Republic	(1990s)	12*
	Hungary	(1991-2000)	13
	Poland	(1990s)	6
Industrial countries	Spain	(1977-85)	17
	Japan	(1992-98)	17
	Finland	(1991-93)	11
	Sweden	(1991)	4
	Norway	(1988-92)	8

Source: Szapáry (2002).

Note: * This number refers to the period up to the end of 1999 and therefore does not include the consolidation of the IPB bank, the largest bank in the Czech Republic.

9) See Wagner and Iakova (2001), Lane (1996) and Daniel (1997) for a deeper discussion on this issue.

10) The recapitalizations in the early 1990s often did not significantly change the behavior of the financial intermediaries. In the Czech Republic and Slovakia, for example, repeated government interventions created a perception of soft budget constraints and led to moral hazard behavior. Reforms in the economy were delayed, since enterprises which had relatively easy access to finance, independent of their creditworthiness, had little incentive to restructure. This lack of progress in enterprise restructuring, in turn, created a feedback effect leading to further deterioration of bank balance sheets.

The most obvious channel for the transmission of monetary policy is the direct interest rate effect. The responsiveness of lending and deposit interest rates to changes in policy rates depends on several factors, including the degree of competition in the banking sector, the depth of financial markets, and alternative sources of financing. Thus, for example, the banking sectors in Hungary and Poland are highly competitive with respect to the corporate lending market, so that policy rate changes are more likely to feed through quickly to loan interest rates. On the other hand, Slovenia's banking sector is oligopolistic in nature, so that the responsiveness of interest rates may be more sluggish (11). Furthermore, in Slovenia, and until recently in the Czech Republic and Slovakia, the banking sectors have been dominated by large state-owned banks, which could diminish the sensitivity of lending and deposit rates.

Further developing the financial sector will make monetary policy more effective.

The pattern of household consumption and the approach to corporate finance in the CEC5 reduces the effectiveness of the interest rate channel of monetary policy in influencing economic activity and domestic demand. With respect to household behaviour, much of consumption is financed through personal savings, and short-term consumption credits are only now growing at a rapid pace –but seemingly regardless of the level of interest rates– as a result of the catch-up effect after years of depressed consumption. In the corporate sector, much of investment is financed either through retained earnings, cross-border borrowing, or FDI. In Hungary and Poland, for example, foreign bank loans to the non-bank commercial sector account for 50 percent or more of all foreign loans directed toward those countries. With transition very advanced, foreign banks are often willing to bypass the local banking system and provide finance directly to the private sector. The Hungarian economy, in particular, with its heavy presence of multinationals, is characterized by a corporate sector with extensive access to offshore financing, which greatly reduces such firms' exposure to domestic monetary policy conditions. And, particularly in the Czech Republic, Hungary, and Poland, FDI inflows have accounted for a significant portion of corporate investment. Leasing has also grown substantially in some of the CEC5; for example, in the Czech Republic, leasing now exceeds 10 percent of lending to enterprises and households. Banks are, therefore, constrained in their ability to raise interest rates in the face of a policy tightening, since many of the blue chips will shift to foreign or other sources of financing.

In view of the relatively low interest-rate sensitivity of consumption and investment, the credit availability channel is likely to be a more important one for the CEC5. When monetary policy is tightened, banks are likely to not only raise lending rates but to also increase the standards for creditworthiness, since relying exclusively on the rationing effect of higher interest rates can result in an adverse selection problem of attracting the most risky borrowers. This channel is particularly important with respect to credit availability to SMEs, for which there are much higher costs for acquiring information. Similarly, a contractionary monetary policy is mostly likely to affect the household sector through a restriction in the supply of credit. Thus, a tightening in monetary policy in the CEC5 is likely to disproportionately affect the SME and household sectors, which usually do not have alternative sources of financing.

11) The legacy of hyperinflation at the end of the 1980s (with inflation reaching 13,000 percent per year in 1989) led to a practice of widespread indexation for most financial contracts. The authorities have recently started the process of deindexation: as of January 1, 2002, all financial contracts of maturity up to one year are de-indexed, and the Banking Association started publishing a nominal reference interest rate that is intended to replace backward-looking inflation as a benchmark for market rates.

The effectiveness of monetary policy is likely to improve naturally as the financial markets mature and once a stable legal environment has been established (12). Part of the maturation process would be a catching-up effect in the aftermath of repressed domestic demand. To this effect, the volume of outstanding credit to the private sector is likely to expand substantially over the medium term, especially credit to households and small businesses. Empirical research on advanced economies indicates that the most sensitive sectors to interest rate changes are residential investment and consumer durables purchases. As the share of consumer credit and mortgage loans increases in bank lending, this development should enhance the impact of monetary policy. In addition, as fiscal adjustment (and financial liberalization) in the CEC5 has increasingly released financial resources for the private sector, this should underpin the responsiveness of aggregate demand to monetary policy over time.

Aside from the everyday challenges facing monetary policy, banking sector crises can directly affect monetary stability. One channel is through the need to inject liquidity into banks. In addition, the monetary authorities could fear allowing the exchange rate to depreciate too far if there has been heavy unhedged foreign borrowing, or could avoid raising interest rates if banks are in poor financial condition. Raising interest rates to defend the currency can weaken the repayment capacity of banks' clients and lead to banking sector problems with liquidity and solvency. That is, the authorities can be caught straddling two horses –trying to maintain monetary stability but at a cost of financial stability or vice-versa.

The completion of legal and institutional reforms and the process of privatisation in the financial sector should increase market efficiency and strengthen the balance sheet of banks, both of which should lead to a more predictable transmission mechanism, and should help to mitigate the potential for banking sector crises. Indeed, the firm establishment of market discipline on financial intermediaries through limiting government intervention to its role as a regulator and supervisor, requiring better and more timely financial information disclosure, and improving the rights of creditors and stockholders, are among the most effective ways to improve market liquidity and strengthen the resilience of financial institutions to monetary and other shocks.

... and vice-versa

Sound macroeconomic policies support financial sector development.

Of course, linkages work in both directions, as financial sector soundness not only affects the macroeconomic policy environment, but is also itself affected by the macroeconomic environment. Business cycles affect the financial sector through a number of channels, including: shifts in risks associated with asset prices, credit quality, interest rates, and liquidity; balance sheets, through changes in the amount and composition of indebtedness; and, ultimately, perhaps a boom-bust cycle precipitated by the bursting of an asset price bubble. Structural changes, particularly as embodied in financial liberalisation (whether domestic or external), can have a significant impact on financial vulnerability. Open economies, such as the CEC5, are even more exposed to external shocks, underscoring the importance of adequate risk management capacity in the financial sector. Overall, the soundness of the financial sector is, to a large degree, a reflection of the economy's health –which, in turn, is heavily influenced by macroeconomic policy.

12) In the meantime, for the CEC5, the exchange rate may be one of the most important monetary policy channels.

An excessively expansionary or restrictive macroeconomic policy stance can exacerbate financial sector vulnerability. A loose policy mix, underpinning inflationary pressures, reduces the information provided by prices and interest rates, can lead to an overly rapid expansion of domestic credit (increasingly allocated to riskier market segments), and can distort asset prices or even create an asset price bubble. Eventual stabilisation or, similarly, a restrictive policy mix –particularly one heavily reliant on monetary restraint– can place strains on the banking system –including through balance sheet effects and rising credit risks-and could even induce a liquidity crisis in the banking sector. Large structural fiscal imbalances can severely complicate the achievement of macroeconomic stabilization –placing the burden of adjustment on monetary policy and the banking sector, putting pressure on the exchange rate, increasing overall debt levels and associated vulnerability, crowding out credit to the private sector, and generally constraining the fiscal response to exogenous shocks. Moreover, an inappropriate policy mix can lead to a loss of foreign and domestic investor confidence, triggering sudden capital outflows or a significant deterioration in external financing conditions, either of which increases the vulnerability of the domestic financial sector.

The choice of macroeconomic policy instruments has important implications for financial sector soundness. On the fiscal side, tax policy –such as non-deductible loan-loss provisions, bank specific taxes, or heavy capital gains taxes– can undermine financial sector development. On the monetary side, unremunerated reserve requirements, sharp and frequent changes in reserve requirements, direct monetary instruments (e.g., interest rate ceilings), or the absence of a properly functioning lender-of-last resort mechanism could adversely affect banking sector soundness. And the choice of exchange regime can have important implications for financial stability, if, for example, it leads to a prolonged period of over- or under-valuation of the exchange rate or is subject to substantial volatility, particularly in the absence of sufficiently developed markets for hedging risks.

5. Enhancing financial stability

The EU accession process has guided reforms aimed at creating stable financial systems.

Enhancing financial stability and reducing the vulnerability of financial systems –with particular emphasis on the banking sector– are key aims in each of the CEC5. And they face additional challenges in securing the path to financial stability. More specifically, in addition to completing any remaining restructuring and privatisation, the outstanding agenda includes:

- enhancing the legislative framework and working toward effective implementation, including, in particular, streamlining the procedures for collateral liquidation;
- strengthening the independence of supervisory authorities and their legal powers;
- implementing effective consolidated supervision, which should forestall any trend to spin off riskier activities to affiliated non-banks subject to less regulation;
- developing supervisory skills relating to cross-border operations of banks–an especially important task in the integrated market;
- enhancing the laws and supervision abilities to meet the needs of a more sophisticated market place –including internet trading and derivatives;
- improving risk management practices, especially in the area of market risk management –but also with respect to credit, operational, and systemic risk;

Box 3. The Financial Sector Assessment Programme

The Czech Republic, Hungary, Poland and Slovenia have already participated in the Financial Sector Assessment Program (FSAP) and Slovakia's FSAP is scheduled for the 2002 fiscal year. The FSAP –developed as part of the effort to strengthen the architecture of the international financial system– assists the country authorities in identifying areas to further strengthen their financial systems.

In this connection, the FSAP assesses countries' progress in adopting and implementing international financial market standards, and, as confirmed by the outcomes of the FSAP exercises, each of the four participant countries in the CEC5 has made considerable progress with respect to these standards. Importantly, the CEC5 participants have voluntarily chosen to publish the associated Reports on the Observance of Standards and Codes (ROSCs). This transparency increases the accountability of policy makers and should improve the environment for market participants' investment decisions, ultimately leading to improved policy-making and economic performance.

In addition to assessing compliance with international standards, the FSAP takes a broad look at a wide range of factors that could affect financial stability and vulnerability, with a focus on the linkages between financial system developments and the macroeconomy. An FSAP, for example, typically includes a series of stress tests, conducted under a variety of macroeconomic scenarios and external shocks, in order to assess the banking system's vulnerability to market and credit risks. The stress tests for the participating CEC5 countries indicated that their banking systems could likely weather most external or domestic shocks. Nevertheless, an FSAP –and stress tests in particular– can only examine vulnerability at a point in time and should, therefore, not be construed as a "bill of health." For this reason, one of the most important aspects of an FSAP is to encourage the authorities to continue with such monitoring on its own. Indeed, the National Bank of Hungary (NBH) subsequently launched an excellent and comprehensive semi-annual *Report on Financial Stability*. And Slovenia followed up the FSAP with a detailed financial sector Action Plan and timetable, which had been almost fully implemented by end 2001.

In addition to the FSAP exercise, the Fund's regular surveillance also attempts to carefully monitor financial sector vulnerabilities, with an increased emphasis in the aftermath of the emerging market crises of the 1990s. As the Fund builds up experience in the broader framework of vulnerability assessments (including macro-prudential analysis, early warning systems, and analyses of reserve adequacy and debt sustainability), it has encouraged country authorities to assist in this effort by compiling and publicly disseminating macro-prudential information. The CEC5 have also been among the early subscribers to the IMF's Special Data Dissemination Standards, including, notably, the detailed template on international reserves and foreign currency liquidity.

- bringing accounting practices, such as asset valuation, in line with international practice: balance sheets should reflect market values as closely as possible;
- ensuring that a financial safety net (such as deposit insurance or lender-of-last resort facilities) is in place, but is limited so as not to engender moral hazard.

The EU accession process has been beneficial in accelerating the needed legal reforms in the financial sector and in providing clear guidance on the direction for such reforms. All of the CEC5 have either updated or developed banking and securities laws to achieve consistency with the

various EU directives, and the flow of capital and financial services has been significantly liberalised. But, as noted above, the enforcement of the legal framework could still be significantly improved, as the effectiveness of financial system regulations in the CEC5 typically lags their extensiveness. Box 3 describes how the Financial Sector Assessment Program, a joint Fund and World Bank initiative, which complements the Fund's surveillance activities, has assisted in the process.

6. Concluding remarks

As evidenced by past experience in the CEC5, the more comprehensive and forceful is the pace of financial sector reforms, the less is the uncertainty about growth and stability –easing the path to develop and adhere to a realistic macroeconomic framework. In a context of potentially heavy and volatile capital flows, moreover, the importance of sound banking and financial systems for stability cannot be overemphasized. This paper has not only illustrated the role of sound financial systems in supporting macroeconomic policy, but also indicated that the relationship is, of course, a two-way street: a setting of sound macroeconomic policy is crucial for supporting financial sector development.

The CEC5 have made remarkable progress in reshaping their financial sectors, and the last two years have been a period of stock-taking and further reforms, with all countries undertaking initiatives to address remaining problems. The challenge now is to build on this by deepening the legal framework and institutions that underpin financial stability –transparent accounting and auditing, comprehensive supervision, effective bankruptcy mechanisms, and adequate collateral registration and recovery mechanisms.

The remaining challenge is to build upon the remarkable progress to date by deepening the legal framework and institutions that underpin financial stability.

With restructuring and privatisation virtually finished in some cases, and well underway in others, completing the remaining agenda for financial sector reform would help ensure that the CEC5 approach EU accession with financial systems able to withstand most shocks. Key elements in this progress have been the effort to harmonize legislation with that of the EU, advances in implementing international financial standards, and participation in recent Fund and World Bank initiatives (such as the FSAP and publication of the associated ROSCs). These efforts should lay the basis for more effective monetary transmission, help parry capital account hazards, and avoid future threats to fiscal sustainability. By ensuring a stable financial environment, they are a critical foundation to allow the CEC5 to close their economic gap with the economies of the European Union.

References

Callen, T. and Thimann, C. (1997). "Empirical Determinants of Household Saving: Evidence from OECD Countries". International Monetary Fund, (WP/97/181).

Christou, C. and Daseking C. (2001). "Balancing Fiscal Priorities: Challenges for the Central European Countries on the Road to EU Accession", in Feldman and Watson.

James, D. (1997). "Fiscal Aspects of Bank Restructuring". International Monetary Fund, (WP/97/52).

Doyle, P., Kuijs L. and Guorong J. (2001). "Real Convergence to EU Income Levels: Central Europe from 1990 to the Long Term". International Monetary Fund, (WP/01/146); also in Feldman and Watson (2001).

Feldman, R.A. and Watson M.C. (2001). "The Road to EU Accession". A collection of papers covering the Czech Republic, Hungary, Poland, the Slovak Republic, and Slovenia. International Monetary Fund.

Guorong, J. (2000). "Prospects for Private Saving in Poland". *Republic of Poland: Selected Issues*, IMF Staff Country Report (60).

Lane, T. D. (1996). "The First Round Monetary and Fiscal Impact of Bank Recapitalization in Transition Economies". IMF Paper on Policy Analysis and Assessment, (PPAA/96/8).

Masson, P., Bayoumi, T. and Hossein, S. (1995). "Saving Behavior in Industrial and Developing Countries". Staff Studies for the World Economic Outlook, pp. 1-27.

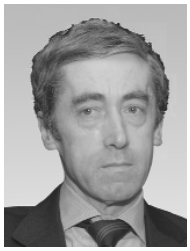
Rodrik, D. (2000). "Saving Transitions". World Bank Economic Review, 14 (3), pp. 481-507.

Szapáry, G. (2001). "Banking Sector Reform in Hungary: Lessons Learned, Current Trends and Prospects". NBH Working Paper (5); revised version forthcoming in "Comparative Economic Studies", 2002.

Haque U., Nadeem, M., Pesaran, H. and Sharma, S. (1999). "Neglected Heterogeneity and Dynamics in Cross-Country Savings Regressions". International Monetary Fund, (WP/99/128).

Wagner, N. and Iakova, D. (2001). "Financial Sector Evolution in the Central European Economies: Challenges in Supporting Macroeconomic Stability and Sustainable Growth". International Monetary Fund, (WP/01/141); also in Feldman and Watson (2001).

Exchange rate regimes and financial vulnerability



Paul De Grauwe

Marianna Grimaldi

1. Introduction

The financial crises of the 1990s have created the perception that one of the fundamental reasons for the occurrence of such crises is to be found in the fact that exchange rates were pegged for too long. These pegged exchange rates inevitably invited speculative attacks in the foreign exchange markets that quite often spilled over to the banking sector, and led to banking crises.

Recently, the analysis of the financial crises has led to a new consensus among policy makers, i.e., the *bipolar view* (see Fischer, 2001). According to this view, countries should allow for either flexible or irrevocably fixed exchange rates in order to avoid future crises while the intermediate solutions, such as pegged exchange rate regimes, should be avoided. The advantages of such intermediate exchange rate regimes have been offset by the disadvantages in terms of uncertainty in the financial markets.

In this paper we analyse this link between the exchange rate regime and the probability of financial crises. We first analyse in the next section the relation between the exchange rate regime and the occurrence of foreign exchange crises, while Section 3 briefly reviews the associated empirical evidence. We then study the relation between the exchange rate regime and the occurrence of banking crises (Section 4). This analysis will also allow us to connect crises in the foreign exchange markets and banking crises. Section 5 concludes.

Before moving into a formal analysis it is useful to start from the essential features present in financial crises. These can be described as follows. Financial crises arise in an environment in which some agents make a promise to convert an asset into another one at a fixed price. For example, monetary authorities promise to convert the domestic currency into a foreign one at a fixed rate. Banks promise to convert outstanding deposits in cash at par. These promises, however, at some point turn out to be a burden on those who have made them, and create a temptation to renege on the promise. When agents suspect that this is the case, they will test the resolve of those who made the promise by converting their assets at the promised price. This triggers a crisis, which can become self-fulfilling.

2. The exchange rate regime and foreign exchange crises: The theory

Economists have been very active in developing models analysing the dynamics of foreign exchange crises, both theoretically and empirically. In this section we present a prototype model that will allow us to study the mechanisms underlying the emergence of financial crises.

We start from the promise made by a central bank to fix the exchange rate today and in the future. Let's assume that apart from the objective of fixing the exchange rate, this central bank also pursues a domestic objective (or is forced by the government to pursue such an objective). This domestic

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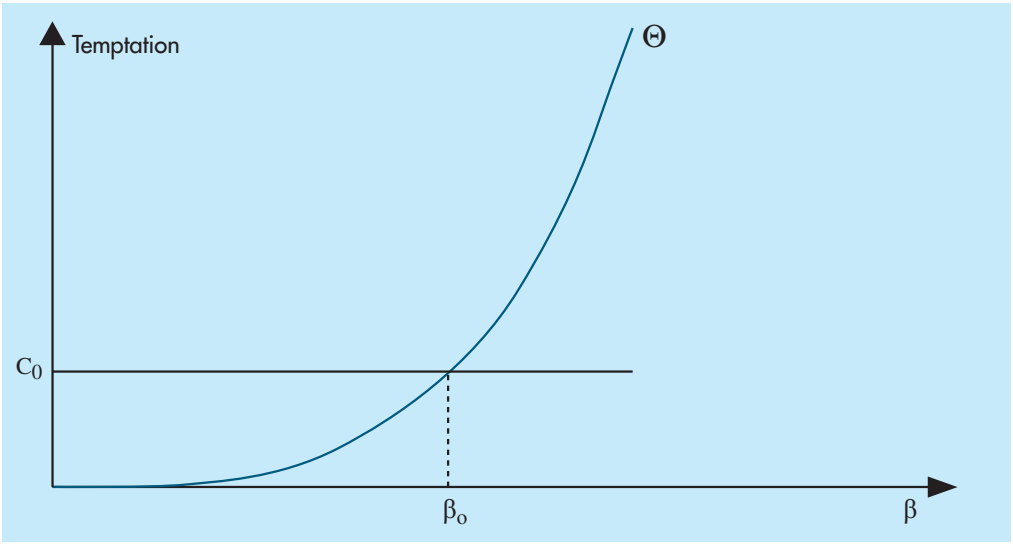
objective could be the stabilisation of output, or the financing of the government budget deficit. The weight it attaches to this domestic objective is represented by β. We can now derive the following schedule (see Figure 1), which describes the relation between the temptation of the central bank to renege on its promise (to devalue) and the parameter β (1). Temptation, Θ, is defined as the benefit for the authorities of devaluing, given that agents expect that the central bank is honest (i.e. will never renege on its promise). We see that when $\beta>0$ the central bank is tempted to devalue, and that this temptation increases with β (2). Clearly such a regime in which the central bank fixes the exchange rate and then gives a non-zero weight to a domestic objective will not be credible. Rational agents will test the central bank and attack its stock of international reserves. Since most central banks in the world give some non-zero weight (however small) to domestic objectives, fixing the exchange rate will most of the time not be credible. We should not observe fixed exchange rates very often.

Figure 1. A central bank's temptation to devalue versus the weight given to domestic policy objectives



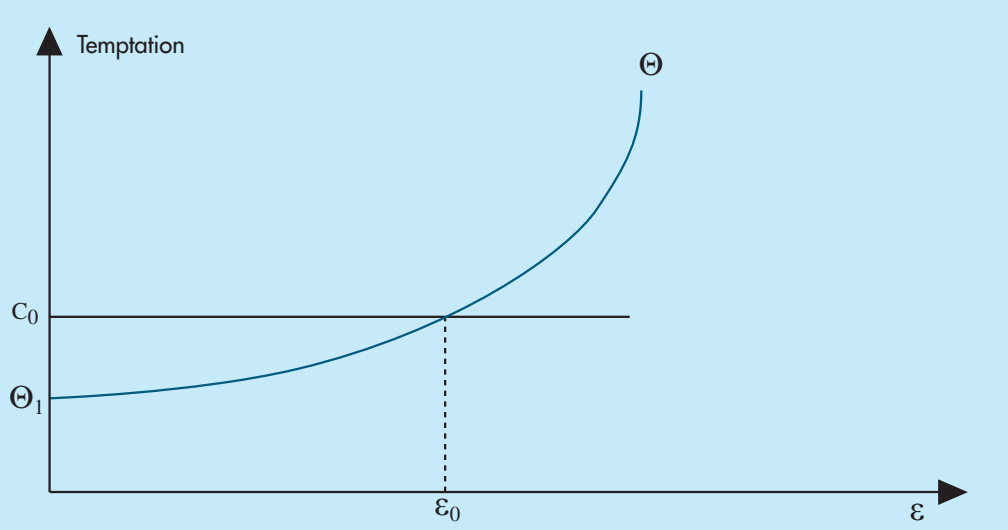
While a strong commitment to a fixed exchange rate system and high costs of abandoning it make such systems more credible ...

One way to allow for the possibility of fixed exchange rates to have credibility is to introduce the notion that reneging on one's promise by devaluing is costly. The cost is a loss of reputation of the monetary authorities. It could also include the cost of having to move into a new exchange rate regime. Let's call this cost C_0, and let us assume it is fixed. We show the effect of this cost in Figure 1. We now find that as long as $\beta< \beta_0$ the fixed exchange rate can be made credible, i.e. the expectations of agents that no devaluation will occur is borne out by the model. Thus, a central bank, which is not too ambitious in pursuing domestic objectives, can maintain a credible fixed exchange rate. Can it do this in all states of nature? The answer is negative. We show this in Figure 2, where we draw the temptation curve, Θ, as a function of the size of the shock (the derivation is found in the Annex). The temptation curve in Figure 2 is drawn for a given β, say β_1. It is upward sloping because the temptation to devalue increases with the size of the shock when the central bank attaches a non-negative weight to a domestic objective. When the shock is zero ($\varepsilon=0$)

1) A formal derivation is given in the Annex.
2) We draw this relation to be non-linear. This has to do with the quadratic utility function of the monetary authorities (see the Annex).

temptation is Θ_1. If this is smaller than C_0, the fixed exchange is credible. In fact, in Figure 2 we have shown the case where the fixed exchange rate is credible when shocks are smaller than ε_0.

Figure 2. The central bank's temptation curve in the presence of shocks



... exogenous shocks are likely to undermine them before too long.

The analysis of Figure 2 leads to an important insight. As time goes by, the probability that some shock will exceed ε_0 is positive (3). As a result, sooner or later countries are hit by a sufficiently large shock that makes the fixed exchange rate non-credible. It will then collapse. Thus, fixed exchange rate commitments cannot stand the passage of time. Only if the central bank can make it clear that it does not pursue any domestic objectives (β=0) can this problem be avoided (4).

The previous analysis is based on what has been called the 'first generation' models (Krugman,1979). These models stress that fixed exchange rates will inevitably collapse when the monetary authorities pursue domestic objectives. Ultimately they will run out of reserves. Thus, the ultimate cause of a foreign exchange crisis always lies with the authorities that pursue inconsistent objectives (see, for example, Flood and Garber, 1984). Speculators have the role of messengers who reveal this basic truth.

Things get more complicated, and more interesting, in the 'second generation' models (Obstfeld, 1996). Consider the case of a country for which $\beta<\beta_0$ (see figure 1), i.e. it attaches a low weight to domestic objectives so that the expectations of agents that no devaluation will occur actually is borne out by the model. In other words, the fixed exchange rate is credible and can be sustained.

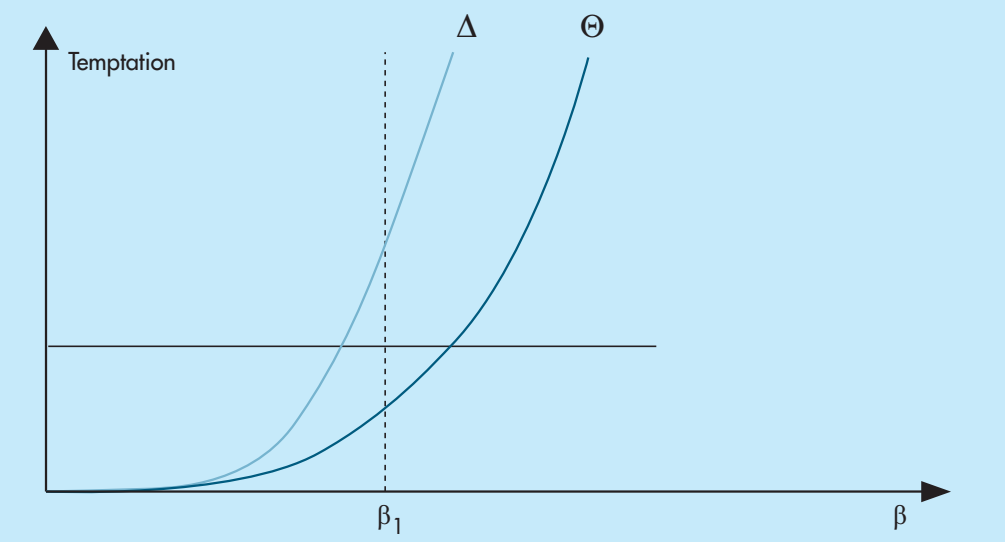
Does this mean that no speculative crisis will occur? Not necessarily. To see this, assume that for some reason speculators expect the currency to be devalued. The authorities that want to maintain

3) The First World War was such a large shock that destroyed the gold standard. Similarly, the EMS crisis of 1992-93 can be interpreted as the result of a large shock (the deep recession of 1992-93) that changed the cost-benefit calculus of maintaining the fixed exchange rate in major EMS-countries.
4) Note that in this case the temptation curve in Figure 2 is a horizontal line coinciding with the horizontal axis. In the EMS period The Netherlands came close to this situation. As a result, it never faced a speculative crisis.

the fixed exchange rate will have to defend it against these speculators. Such a defence, however, is costly. The central bank will have to raise the interest rate, which has an unfavourable effect on output and on the government budget. It may also fragilise the banking system (we come back to this theme later). As a result the central bank will be tempted to abandon the peg. Here the temptation arises from the fact that when speculators expect a devaluation, defending the fixed rate is costly. By devaluing, this cost is avoided. We show the temptation to abandon the peg when speculators expect a devaluation in Figure 3, by the upward sloping line, Δ.

Obviously the higher the coefficient β, the greater is the temptation to abandon the fixed exchange rate in the face of a speculative attack. We have also assumed that this temptation curve Δ is located above the temptation curve Θ (which represents the temptation to cheat when speculators do not expect a devaluation). This is due to an asymmetry. The welfare loss involved in applying deflationary policies to defend the peg in the face of a speculative attack is greater than the welfare gain obtained from the expansionary output effects of a surprise devaluation. As a result the temptation to abandon the peg during a speculative crisis is larger than the temptation to cheat in normal times.

Figure 3. The central bank's temptation curve with (Δ) and without expectations of a devaluation (Θ)

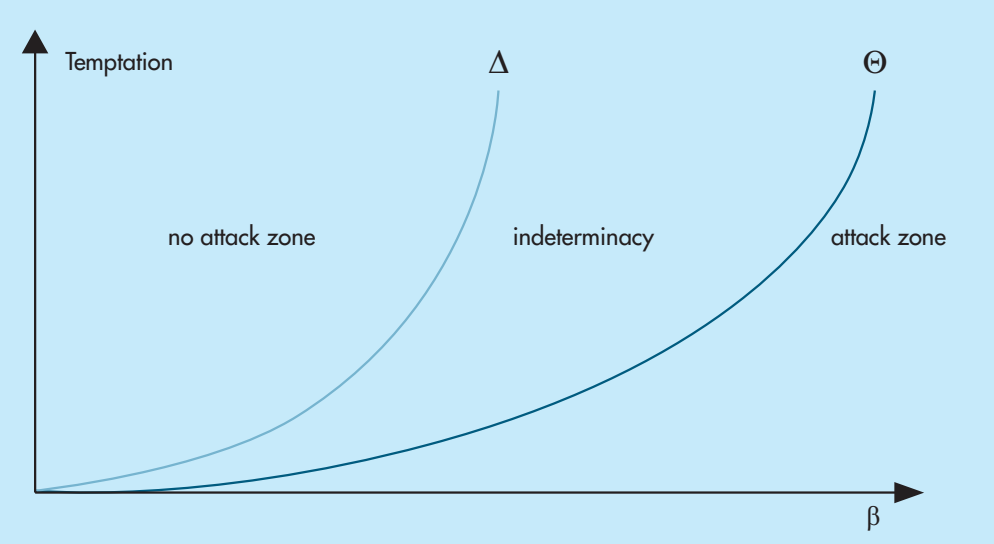


The life expectancy of a fixed exchange rate system is the longer the higher the cost of abandoning it.

We now obtain the following interesting result. Consider a country with $\beta=\beta_1$. The cost of devaluation is C_0 (see Figure 3). It can be seen that if speculators do not expect a devaluation the temptation of the central bank to devalue, Θ, is lower than the cost of a devaluation. Thus when no devaluation is expected the central bank has no incentive to devalue. There will be no devaluation. The expectations of the speculators are model-consistent (rational). Consider now what happens when speculators expect a devaluation. The relevant temptation curve is Δ, and we observe that the temptation to devalue is now larger than the cost of a devaluation. Thus the central bank now has an incentive to devalue, and will do so. Speculators were right to expect a devaluation. Their expectations are model-consistent (rational). There are therefore two possible equilibria that depend solely on the state of expectations. When agents do not expect a devaluation the authorities have

no incentive to devalue so that the exchange rate remains fixed. When, however, speculators expect a devaluation, the ensuing speculative attack creates an incentive for the authorities to devalue, and there will be a devaluation.

Figure 4. Speculative attacks, temptation to abandon the peg, and non-monetary central bank objectives



The example given in Figure 3 is only one of many possibilities. Whether or not crises occur will depend on the combinations of β and C. Three situations can occur (as shown in Figure 4):

- When β is low and C is high, we are in the no attack zone. The cost of devaluing will always exceed the temptations to devalue even when speculators expect a devaluation. As a result, even if attacked, the authorities have no incentive to devalue. No devaluation occurs.
- When β is high and C is low we are in the attack zone. In this case, the cost of devaluation is lower than the temptations so that a speculative attack is inevitable and the fixed exchange rate must collapse.
- Finally, there is the intermediate zone (indeterminacy zone) where the cost of devaluation is intermediate between the two temptation curves. This is the zone where two solutions exist, i.e. one in which the exchange rate is kept fixed and the other in which a devaluation occurs.

We can use this framework to analyse some policy issues. The first issue has to do with capital movements. Since the early 1990s, many countries have liberalised capital movements. This may be good policy to improve the development prospects of emerging countries. It is also clear, however, that the liberalisation of capital movements fragilises fixed exchange rate regimes. This can be shown using the framework of Figure 4. The effect of greater capital mobility is to shift the temptation line (Δ) upwards. The reason is that in a world of high capital mobility the expectations of devaluation lead to an immediate increase in domestic interest rates, an inversion of the yield curve and large outflows of capital. All this raises the cost of defending the existing peg, and thus the temptation of the authorities to abandon the fixed peg. As a result, the no attack zone shrinks

while the indeterminacy zone becomes larger. Thus, in a world of capital mobility the fixed exchange rate regime becomes more prone to unpredictable self-fulfilling speculative attacks. In addition, in such a world contagion is more likely to be important. The reason is that when a country is located in the indeterminacy zone a crisis in a neighbouring country, which affects expectations, is likely to turn into a self-fulfilling speculative attack.

While capital account liberalisation reduces the survival chance of fixed exchange rates...

How can countries deal with the increased fragility of the fixed exchange rate in a world of capital mobility? The most obvious answer is to move away from the fixed exchange rate regime and to allow for more flexibile exchange rates. Major international institutions, like the IMF, have been tempted by the previous analysis to advise countries exactly that. It is clear that if foreign exchange crises are the only financial crises one has to worry about, this advice makes a lot of sense. It is unclear, however, that this remains the sensible policy advice if one takes into account the possibility of banking crises. We return to the issue of banking crises in the next section.

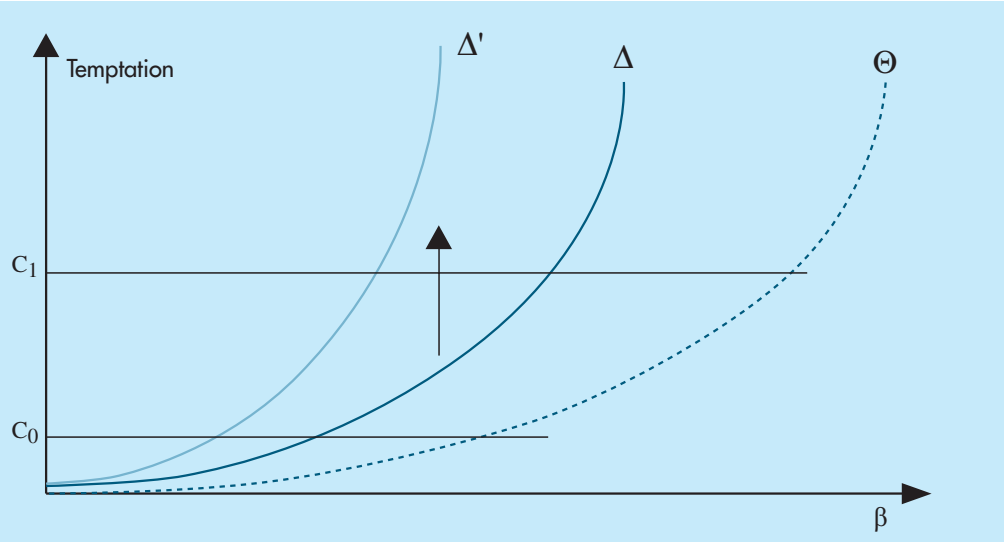
Another sensible policy advice is to re-impose capital controls. Some countries in fact have done this in the aftermath of the Asian financial crises. It is doubtful, however, whether this is a long run solution. The reason is that as economic integration proceeds, the necessity to open up capital markets becomes more intense. Thus, sooner or later, countries with fixed exchange rates that integrate into the world economy are confronted with the increasing fragility of the fixed exchange rate.

Is there a way to reduce the fragility of the fixed exchange rate regime in a world of capital mobility? The framework of Figure 4 provides some answers. There are essentially two ways to achieve more robust fixed exchange rate regimes. The first method consists in increasing the cost of devaluations, the second in reducing the weight countries attach to domestic objectives.

These solutions are depicted in Figure 5. As a result of increasing capital mobility, the temptation curve Δ shifts upwards (from Δ to Δ'). If the authorities wish to keep the economy within the no attack zone, they can do one of two things (or a combination of the two). They can increase the cost of devaluation from C_0 to C_1, which allows them to maintain the same weight for domestic objectives. Or they can reduce the weight for domestic objectives, β, while leaving the cost of devaluations unchanged.

Many countries, which have chosen to maintain a fixed exchange rate, have moved in the direction of increasing the cost of a devaluation. Some have achieved this by a currency board. An interesting experiment was provided by the EU countries prior to the start of EMU. In the context of the Maastricht convergence criteria, countries had to maintain a fixed exchange rate (albeit with a large band). Failure to do so was punished by a ban on entry into EMU. As the political commitment to EMU was strong, the penalty for devaluation became very high during the transition period. The result was that the prospective EMU countries were spared foreign exchange crises during the transition. This happened while the rest of the world (Asia, Russia, Latin American countries) experienced major financial crises.

Figure 5. Maintaining exchange rate stability with increasing capital mobility



This episode can be instructive for Central and Eastern European countries preparing themselves for the accession into the EU and the subsequent entry into EMU. Once the date of entry has been fixed, making the entry conditional on a no-devaluation clause is likely to stabilise the foreign exchange market and to eliminate the risk of foreign exchange crises on the road to EMU. Such a condition should ensure a crisis-free transition period.

... this effect can be mitigated by raising the cost of abandoning them.

The previous analysis suggests that by increasing the cost of devaluations the credibility of fixed exchange rate regimes can be increased. We should have no illusions though. As we showed earlier, time is generally against fixed exchange rate regimes. With the passage of time some shock large enough to destroy the authorities willingness to defend a fixed exchange rate commitment is bound to occur. This implies that the transition period for the Accession countries should not be too long.

3. Empirical evidence

The first and second generation models have been tested empirically. The procedure has been to search for leading indicators (fundamental economic variables) capable of predicting the occurrence of foreign exchange crises (see, for example, Kaminsky, Lizondo and Reinhart, 1998; Kaminsky and Reinhart, 1998; and Sachs, Tornell and Velasco, 1996). A currency crisis is identified by a measure of exchange rate pressure (crisis index). This index is computed by a weighted average of exchange rate changes and foreign reserves changes (5). When the index value is above its mean by (at least) three standard deviations it is considered as a crisis. A variable is a useful leading indicator when it displays "anomalous" behaviour before a crisis and a "normal" behaviour in tranquil periods. In order to identify an "anomalous" behaviour a selection rule is adopted such that it minimises the probability of not predicting a crisis and the probability of giving

5) A better index should include also interest rate changes. However, they are excluded because of the lack of data.

a false signal. A set of "best predictors" has been identified for a currency crisis. The best predictors are (in descending order):

- overvaluation of the real exchange rate,
- worsening of the ratio exports/imports,
- an increasing ratio of (broad) money over foreign exchange reserves,
- a decline of stock prices and output.

It should be stressed that the predictive quality of these leading indicators remains relatively poor. This no doubt has to do with the problem identified in the second-generation model, i.e. the existence of a zone of indeterminacy. The latter implies that sometimes a given change in the leading indicators triggers a crisis and sometimes it does not. Recent research by the authors shows that in high inflation countries these leading indicators have a higher predictive power than in low inflation countries. This suggests that when the size of the changes in the leading indicators becomes very high (which is typically the case in high inflation countries) they have an unambiguous effect in triggering crises.

4. The exchange rate regime and banking crises

As was mentioned earlier, the analysis of the causes of foreign exchange crises has led to a consensus view that in a world of increasing financial integration fixed exchange rate regimes have become too fragile. This has led to the view that countries have only two options, either to move to more flexible exchange rate regimes or to move into a monetary union. Does this conclusion hold when we enlarge the analysis to include banking crises?

Foreign exchange crises may trigger banking crises (and vice versa). This possibility increases the cost of abandoning the fixed rate, thus making its demise less likely.

The relation between the exchange rate regime and banking crises is complicated. This complexity has to do with the fact that there are opposing forces at work. In this section we analyse the nature of this link.

A first thing to note is that the foreign exchange market and the banking sector are intricately linked, so that crises in the foreign exchange market spill over into the banking sector. This link is twofold.

First, there is the interest rate link. When an exchange crisis erupts, this forces the monetary authorities to raise the short-term interest rate. Typically this results in a strong inversion of the yield curve. It is not uncommon during speculative crises that the very short-term interest rate (e.g. call money rate) shoots up to several hundred percents. The business of banks is to borrow short and to lend long. As a result, during a foreign exchange crises banks suffer considerable losses, making it not uncommon that the crises that started in the foreign exchange market ends up in a domestic banking crisis.

A second link that reinforces the contagion between crises in the foreign exchange market and the banking sector has to do with the latter's role in the payments system. With each crisis in the foreign exchange market, large capital outflows occur. This also shows up in the form of a reduction of the reserve position of the domestic banks. In order to avoid that the capital outflow leads to a liquidity

crisis in the domestic banking sector, the central bank routinely uses sterilisation policies, i.e. it prevents that the capital outflow reduces domestic liquidity. This is fine as far as the banks are concerned, but this policy weakens the balance sheet of the central bank and makes the rundown of its international reserves more likely. Thus, quite often the central bank will want to preserve the liquidity position of the domestic banks in order to avoid a banking crisis. This, however, makes the central bank itself more vulnerable to renewed speculative attacks, which in turn weakens the liquidity position of commercial banks. The upshot of all this is that a fixed exchange rate has the potential of making the domestic banking system more fragile.

It should be noted that the causality often moves in the other direction, i.e. a banking crisis can trigger a foreign exchange crisis. When a banking crisis erupts, the attempts of the central bank to provide liquidity to the banking sector weakens the central banks balance sheet and makes it more vulnerable to speculative attacks. Currency and banking crises are therefore often labelled as the twin crises since they have common roots and a reciprocal reinforcing nature (Kaminsky and Reinhart ,1998).

Following up on the experience of Asian countries, economists have identified an additional link between a fixed exchange rate and the probability of a banking crisis (6). This goes as follows. When the authorities fix the exchange rate and commit themselves to maintaining this, they may create a moral hazard problem in countries where the domestic interest rate exceeds the foreign one. Banks may then have an incentive to borrow at the low foreign interest rate and to transform the proceeds of this foreign borrowing into domestic currency loans. In efficient markets this incentive should not occur because banks will correctly perceive the risks involved. However, there are several reasons to believe that banks may misperceive the risks. First, the solemn commitment to a fixed exchange rate may lure the banks to underestimate the risks involved. Second, and more importantly, the expectation of bailouts by the authorities may give poorly supervised domestic banks an incentive to over-borrow in foreign currency.

Thus, there are reasons to believe that a crisis that erupts in the foreign exchange market is transmitted to the banking sector, so that it degenerates into a twin crisis involving both the exchange market and the banking sector. This is all the more so when the liberalisation of capital movements increases the size of the liquidity flows and the domestic interest rates in the wake of a speculative movement in the foreign exchange market. It has been argued that the combination of high capital mobility, fixed exchange rates and relatively feeble bank supervision is a major cause of the banking crises of the 1990s.

High capital mobility combined with feeble bank supervision increases the risk of "twin crises".

The previous analysis suggests that a fixed exchange rate regime is conducive to bank crises. This also seems to have become the consensus view. The trouble with this analysis is that there is very little empirical evidence indicating that banking crises have been more frequent in fixed exchange rate environments than in flexible exchange rate regimes. We briefly survey the evidence.

The studies mentioned before (7) also trace out the link between leading indicators and measures of banking crises (with this being identified by a bank run or extraordinary operations as mergers,

6) This analysis has led to so-called "third generation models" of financial crises.
7) That is Kaminsky, Lizondo and Reinhart (1998), *Kaminsky and Reinhart* (1998), *and Sachs, Tornell and Velasco* (1996).

take-overs or bailouts). The best leading indicators for a banking crisis are (again in descending order):

- change in the real exchange rate,
- change in the money multiplier,
- the worsening of the stock market,
- a decline of output.

The earliest signals of the leading indicators are within a window of 18 months before the banking crises. None of these studies finds significant effects of the exchange rate regime on the probability of banking crises. The only empirical study to date identifying such an effect is Domaç and Peria (2000), which paradoxically finds that flexible exchange rate regimes in developing countries are more likely to lead to banking crises than fixed exchange rate regimes. This result appears to be quite robust for different definitions of the crisis index.

The surprising result that banking crises are as frequent under flexible as under fixed exchange rates may be because flexible exchange rates indicate loss of macroeconomic credibility.

How can this empirical evidence be explained? We propose two avenues. The first one is based on the idea that especially in developing countries a floating exchange rate is an indicator of domestic monetary and financial upheaval. Most developing countries that allow the exchange rate to fluctuate are countries that have lost credibility in their macroeconomic policies. The domestic turbulence that ensues provides an environment for frequent business failures, which in turn triggers banking crises.

Second, contrary to what mainstream economic models tell us, flexible exchange rates generally do not perform their stabilising role well. The traditional view about flexible exchange rates is that they allow countries to adjust more flexibly to asymmetric shocks originating in the goods and labour markets. When, for example a deterioration of the terms of trade occurs, a depreciation of the currency will soften the macroeconomic effects of this shock. The empirical evidence, however, is that the exchange rates react very little to shocks in macroeconomic fundamentals. Instead most of the changes in the exchange rates are produced by the news in the exchange rates themselves (Goodhart ,1989; Goodhart and Figliuoli, 1991; Frankel and Rose, 1995; and Obstfeld and Rogoff, 2000). This implies that the movements of exchange rates are an independent source of volatility, unrelated to the volatility of underlying macroeconomic fundamentals. In such an environment the volatility of the exchange rates increases the fragility of the balance sheets of local businesses and banks. This is especially the case in countries where the supervision of banks is poorly organised.

All this leads to the conclusion that a flexible exchange rate does not necessarily provide for an environment conducive to financial stability. The evidence of the developing countries indicates that flexible exchange rates for many of them are a more serious source of financial fragility than fixed exchange rates. The consensus view among policy makers that countries that are unable or unwilling to move into a monetary union (or some other form of union such a 'dollarization') should allow for more exchange rate flexibility should be revised.

The previous analysis about the problems with flexible exchange rates allows us to amend our analysis of financial crises in a fixed exchange rate model. Let us return to figure 5. We argued that the increase in capital mobility increased the cost of defending the exchange rate under attack, so that when a speculative attack arises, the central bank will have a strong incentive not to defend the fixed exchange rate. As a result, the fixed exchange rate regime is made more fragile. This analysis now turns out to be incomplete. On should add that as time goes by, more banks are willing to increase their foreign exposure in a fixed exchange rate regime. As a result, when a speculative attack occurs the central bank will find it very costly to devalue, knowing that such a devaluation will lead to large losses in banks and in the corporate sector. Thus the gradual liberalisation of capital movements has led to an upward shift of both the cost of temptation curve (Δ) and the cost of a devaluation. The net effect on the fragility of the fixed exchange rate regime is therefore ambiguous.

5. Conclusion

The analysis of this paper leads to a number of conclusions. These can be summarised in three points.

First, fixed exchange rate regimes are becoming more fragile in a world of intense financial integration. Since the exchange markets and the banking sector are strongly intertwined, crises in the foreign exchange markets can easily spill over into the domestic banking sector leading to a twin crisis.

Second, flexible exchange rates are also conducive to banking crises. In fact, in developing countries, banking crises occur more often in an environment of flexibility of the exchange rate. The reasons are that the flexibility of the exchange rate usually reflects a failure of national authorities to follow stable and predicable policies. In addition, it appears that the exchange rate is rarely a tool to improve the adjustment process following macroeconomic disturbances. It is more often than not a significant source of monetary and macroeconomic instability endangering the stability of the banking sector.

The view that more exchange rate flexibility reduces the probability of financial crises is not well founded.

Third, a crucial factor in determining how the exchange rate regime affects the stability of the banking sector is the quality of bank supervision. In countries with well-developed supervision a crisis in the foreign exchange market rarely leads to a banking crisis. For example, the ERM pegged exchange rate regime led to frequent foreign exchange crises. None of these crises spilled over into a banking crisis. Similarly, the substantial flexibility of the dollar vis-à-vis the major currencies did not trigger banking crises in the major industrialised countries. In the absence of a well-functioning supervisory system both fixed and flexible exchange rate regimes contain a number of triggers that can precipitate banking crises. The surprising empirical finding is that flexible exchange rates may produce more of these triggers than fixed exchange rates.

We conclude that the consensus view that emerging countries should allow for more exchange rate flexibility as a means to reduce the probability of financial crises is not well founded.

References

Barro, R. and Gordon, M. (1983). "Rules, discretion and reputation in a model of monetary policy". *Journal of Monetary Economics*, 12(7), pp. 101-121.

Domaç, I. and Soledad Martinez Peria, M. (2000). "Banking crises and exchange rate regimes: is there a link?" *World Bank Working Paper*.

Fischer S. (2001). " Exchange rate regimes: is the bipolar view correct?" *Journal of Economic Perspectives*, 15(2), pp. 3-24.

Flood, R.P. and Garber, P.M. (1984). "Collapsing Exchange-Rate Regimes: Some Linear Examples". *Journal of International Economics*, 17(1-2), August, pp. 1-13.

Frankel, J. and Rose, A. (1996). "Currency crashes in emerging markets: an empirical treatment". *Journal of International Economics*, (41), pp. 351- 366.

Goodhart, C. (1989). "News and the Foreign Exchange Market". LSE Financial Markets Group Discussion Paper, (71).

Goodhart, C. and Figliuoli, L. (1991). Every Minute Counts in the Foreign Exchange Markets. *Journal of International Money and Finance*, (10), pp. 23-52.

Kaminsky, G., Lizondo, S. and Reinhart, C. (1998). "Leading Indicators of Currency Crises". *International Monetary Fund Staff Papers*, 45(1), March, pp. 1-48.

Kaminsky, G. and Reinhart, C. (1998). " The twin crises: the causes of banking and balance of payment problems". International Finance Discussion Paper (544), Board of Governors of the Federal Reserve System.

Krugman, P. (1979). " A model of balance of payments crises". Journal of Money, Credit and Banking, (11), August, pp. 311-25.

Obstfeld, M. (1996). "Models of currency crises with self-fulfilling features". European Economic Review, 40(3-5), pp. 1037-47.

Obstfeld, M. and Rogoff, K.(2000). The Six Major Puzzles in International Macroeconomics: Is there a Common Cause?. NBER Working Paper (7777), July.

Sachs, J., Tornell, A. and Velasco, A. (1996). "Financial crises in emerging markets: The lessons from 1995". Brookings papers on economic activity, 0(1).

Annex

In order to derive the temptation and cost of defence curves we move in three steps. First, we set a model that allows us to derive the optimal rule for the inflation rate. Second, we look at different solutions of the model under different exchange rate regimes. Third, we compute temptation and cost of defence. We start from temptation. In order to do so, we present a model that is based on the standard model of Barro-Gordon (1983). But our model departs from it because we look at an open economy. We then introduce the cost of defending a pegged exchange rate.

The monetary authorities minimise the loss function

(A.1)

$$L = (\pi - \pi^*)^2 + \beta(y - y^*)^2 + C(\pi)$$

$$C(\pi) = C \quad \text{if} \quad \pi \neq \pi^*$$

$$C(\pi) = 0 \quad \text{if} \quad \pi = \pi^*$$

where y is the output, y^* the authorities' output target, π is the inflation rate, $\beta > 0$ is the weight attached to output stabilisation. Assuming PPP holds, π corresponds to the rate of currency depreciation. $C(\pi)$ is a cost term that can be viewed as the political cost to reneging on a promise to fix the exchange rate regime (see Obstfeld (1996) for a similar specification). For simplicity we consider this cost to be fixed. Under a fixed exchange rate $\pi = 0$ (1).

Inflation is determined by the expectations-augmented Phillips curve

(A.2)

$$\pi = \frac{1}{a}(y - y_n) + \pi^e + \varepsilon$$

where π is the rate of inflation, π^e is expected inflation, y is output, y_n is the 'natural' output level, $(y - y_n)$ can be interpreted as the output gap, and ε is a random inflation shock (2).

It is assumed that the *output target* is larger than the natural output level (3)

(A.3)

$$y^* = \lambda y_n \quad \text{with} \quad \lambda > 1$$

Rewriting equation (A.2) in terms of output and substituting together with (A.3) in equation (A.1), and deriving the first order condition, we find the authorities' optimal rule for the inflation rate given the expectations of private agents: (4)

(A.4)

$$\pi = \frac{1}{1 + a^2\beta}\pi^* + \frac{(\lambda - 1)a\beta}{1 + a^2\beta}\, y_n + \frac{a^2\beta}{1 + a^2\beta}\,\pi^e + \frac{a^2\beta}{1 + a^2\beta}\,\varepsilon$$

1) More generally, the authorities can peg the rate of depreciation (a crawling peg is typically used in high inflation countries). In that case π is a constant π^*. The cost term C is then the cost of deviating from the crawling peg.
2) The equilibrium is assumed as time invariant, therefore the time subscripts are omitted.
3) This is the usual assumption of the Barro-Gordon model and it leads to an inflation bias. The justification is that the authorities pursue a lower level of unemployment than the natural one because of the distortion of the labour market.
4) It is assumed that the authorities control the inflation directly.

Let us first analyse the solution under discretion, which is the solution in a flexible exchange rate system. (We will call it the *flex solution*). We define it as a benchmark to compare with the solutions under a pegged exchange rate.
The solution for inflation and output under discretion (flex solution) is given by

(A.5) $$\pi = \pi^e + \frac{a^2\beta}{1+a^2\beta}\,\varepsilon$$

(A.6) $$\pi^e = a\,\beta\,(\lambda - 1)\,y_n + \pi^*$$

(A.7) $$y = y_n - \frac{a}{1+a^2\beta}\,\varepsilon$$

In deriving (A.5) to (A.7) we have proceeded as follows. First, it is assumed that private agents have rational expectations and, therefore, use all available information, including the preferences of the monetary authorities. Taken this into account, $E[\pi]$ can be determined on the basis of the monetary authorities' optimal rule for the inflation rate as specified in (A.4). Observing $E[\varepsilon] = 0$, one arrives at

(A.8) $$E[\pi] = \frac{1}{1+a^2\beta}\,\pi^* + \frac{(\lambda - 1)a\beta}{1+a^2\beta}\,y_n + \frac{a^2\beta}{1+a^2\beta}\,\pi^e$$

Setting $E[\pi] = \pi^e$ and rearranging terms yields equation (A.6). Second, using (A.4) and (A.6) in (A.2) leads to (A.7). Finally, replacing π^* in (A.4) with the expression for π^* contained in (A.6) results in (A.5).

By substituting the equilibrium values of π^e and y in the loss function (but disregarding the cost of devaluation), we identify the loss the authorities incur under discretion. We call this L_{flex} (5).

(A.9) $$\boxed{L_{flex} = \frac{a^2\beta}{(1+a^2\beta)}\,\varepsilon^2 + 2a\beta k\varepsilon + [a^2\beta + 1]\,\beta k^2}$$

where $$k = (\lambda - 1)\,y_n > 0$$

We now analyse the solution of the model when the authorities peg the exchange rate, i.e. they set $\pi = \pi^*$ (where π^* can be zero if the peg is a fixed exchange rate peg). We will identify solutions to be equilibrium-solutions when they produce an outcome for which the expectations are model consistent. Let us start with the pegged exchange rate solution when agents expect the pegged exchange rate to be maintained. Thus the peg is fully credible. We call this the *fix* solution*. The solution for inflation and output is given by

(A.10) $$\pi = \pi^* = \pi^e$$

(A.11) $$y = y_n - a\varepsilon$$

5) Note that we compute the loss function as a function of the size of shocks.

Substituting those equilibrium values into the loss function (but disregarding the cost of devaluation) yields the loss function under a credible pegged exchange rate (*fix* solution*):

(A.12)
$$L_{fix^*} = \beta k^2 + \beta a^2 \varepsilon^2 + 2a\beta k\varepsilon$$

As it is well known from the Barro-Gordon (1983) model, the authorities will have an incentive to renege on their announcement (cheat). In order to find the expression for this incentive we compare L_{fix^*} with the loss obtained under cheating. The *cheat solution* arises when the agents expect a pegged exchange rate and the monetary authorities devalue (cheat). In this case:

(A.13)
$$\pi^e = \pi^*$$

(A.14)
$$\pi = \pi^* + \frac{(\lambda - 1)a\beta}{1 + a^2\beta} y_n + \frac{a^2\beta}{1 + a^2\beta} \varepsilon$$

(A.15)
$$y = \left(\frac{(1 + a^2\beta\lambda)}{1 + a^2\beta} y_n - \frac{a}{1 + a^2\beta} \varepsilon \right)$$

Substituting into the loss function (disregarding the fixed devaluation cost) yields the loss under cheating (L_{cheat}):

(A.16)
$$L_{cheat} = \frac{a^2\beta}{(1 + a^2\beta)} \varepsilon^2 + \frac{2a\beta k}{(1 + a^2\beta)} \varepsilon + \frac{\beta k^2}{(1 + a^2\beta)}$$

The difference between the *fix*solution* and the *cheat solution* measures the temptation Θ to devalue. The larger is the temptation the bigger is the authorities' incentive to devalue. To calculate $\Theta = L_{fix^*} - L_{cheat}$ we use (A.12) and (A.16) and find

(A.17)
$$\Theta = \frac{a^2\beta^2}{(1 + a^2\beta)} \left(a^2\varepsilon^2 + 2ak\varepsilon + k^2 \right)$$

We find that temptation is a non-linear function of the shocks.

We now derive the temptation to devalue when agents expect a devaluation. In order to compute it we assume that the authorities fix the exchange rate but that agents expect that the authorities return to the discretionary solution. We call this a *non-credible fix solution*. We compute the loss obtained under this solution. In order to do so, we first solve for inflation and output, and then substitute into the loss function (disregarding the fixed devaluation cost), i.e.

(A.18) $$\pi = \pi^*$$

(A.19) $$\pi^e = \pi^* + a\beta(\lambda - 1)y_n$$

(A.20) $$y = y_n + a(-a\beta(\lambda - 1)y_n) - a\varepsilon$$

(A.21) $$\boxed{L_{fix} = a^2\beta\varepsilon^2 + 2a\beta k(1 + a^2\beta)\varepsilon + \beta k^2(1 + a^2\beta)^2}$$

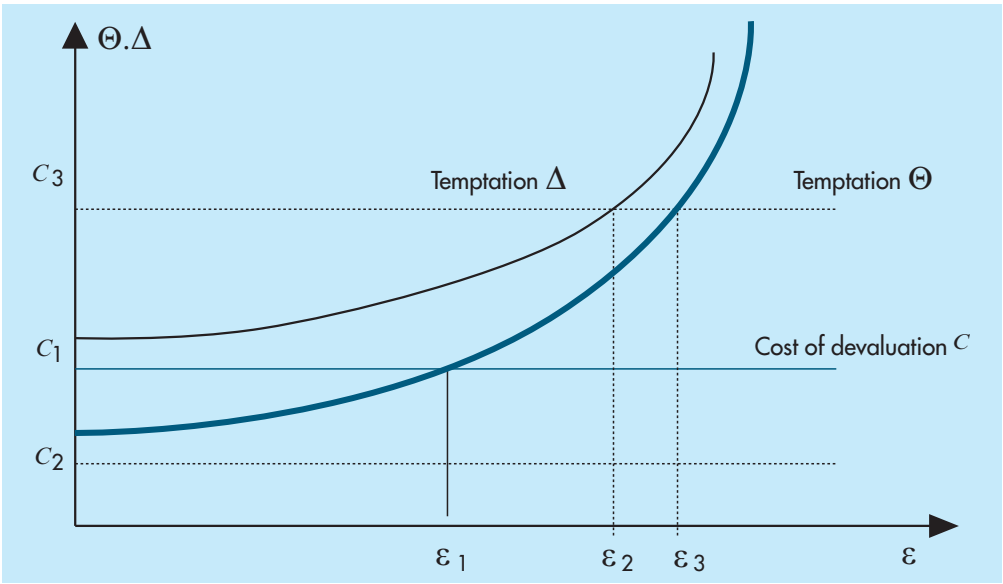
L_{fix} can be interpreted as the loss incurred by the authorities when they peg the exchange rate while agents expect the authorities to abandon the peg and to revert to the discretionary equilibrium. We can now find a measure of the cost of defending the exchange rate as the difference between L_{fix} and L_{flex} (the latter is the loss under discretion derived earlier). We call this difference the *temptation to abandon the fixed peg* (Δ), i.e. it is the additional loss resulting from defending the peg in the face of an expected devaluation compared to the loss incurred when the authorities follow a discretionary policy. We find

(A.22) $$\boxed{\Delta = L_{fix} - L_{flex} = \frac{a^4\beta^2}{(1 + a^2\beta)}\varepsilon^2 + 2a^3\beta^2 k\varepsilon + a^2\beta^2 k^2(1 + a^2\beta)}$$

Like Θ, the *temptation*, Δ, is positively related to the size of the shocks.
We find that the second temptation (Δ) is always larger than the first one (Θ). This can be seen by setting $\varepsilon = 0$. We then find that $\Delta > \Theta$. It can also be shown that as $\varepsilon \to 0$, $\Delta = \Theta$.

In figure A.1, we show both temptation functions (Θ and Δ) as a function of the size of shocks.

Figure A.1. Temptations as a function of size of shocks



Anchor, float or abandon ship: Exchange rate regimes for the Accession countries

Willem Buiter

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1. Introduction

This paper investigates the appropriate exchange rate regimes, both prior to and following European Union accession, for those former centrally planned Central and Eastern European countries that are currently candidates for full membership in the European Union (1). The exchange rate regime is a key determinant of a country's macroeconomic stability, which is in turn a key determinant of the investment climate. The choice of exchange rate regime is therefore of great relevance to all who are interested in the transition process.

It now seems likely that as many as eight out of the ten candidate countries from the EBRD's region of operations will become EU members by early 2004, in time to participate in the EU Parliamentary elections of June 2004. Further delays beyond 2004 are, however, certainly possible, as enlargement has effectively become contingent on the success of internal reforms in the EU. Inadequate reforms of European institutions may also pose obstacles to successful EU candidates that wish to join European Monetary Union (EMU) at an early date. The body making monetary policy in the European Central Bank (ECB) is the Governing Council. It currently has 18 members - six Executive Board members and 12 national central bank governors, one for each of the 12 EMU member countries. Formally, all 18 members have equal weight in the decision making process. Eighteen members are already too many from the point of view of effective discussion, deliberation and collective decision-making. Enlarging an unreformed European Central Bank (ECB) to include ten new members would turn the current 18 member ECB Governing Council into an unwieldy, indeed unmanageable group (2).

EU membership does not imply immediate membership in EMU. It is true that for the current crop of accession candidates, any formal derogation from EMU membership, of the kind obtained earlier by the UK and Denmark, will no longer be possible. The obligation to join EMU, once the Maastricht criteria for membership are satisfied (3), will be part of the *acquis communautaire* that

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1) These are Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia.

2) The eight Central European and Baltic countries of Footnote 1, plus Cyprus and Malta.

3) Recall that the full set of macroeconomic Maastricht criteria for membership in EMU is as follows. There is a pair of financial criteria, a ceiling on the general government deficit - to - GDP ratio of 3 percent and a ceiling on the gross general government debt - to - GDP ratio of 60 percent. There also is an interest rate criterion: long-term (ten year) nominal interest rates on the public debt are to be within 2 percent of the average in the three countries with the best inflation record. Next comes the inflation criterion: the annual inflation rate cannot exceed the average of the three best performing countries by more than 1.5 percent. Then there is the exchange rate criterion: the exchange rate has to respect the normal fluctuation margins provided for by the exchange-rate mechanism of the European Monetary System without severe tensions for at least the last two years before the examination (that is, the formal assessment as to whether a candidate has met the EMU membership criteria). In particular, the Member State shall not have devalued its currency on its own initiative for the same period. The interpretation of the ECB and, until quite recently, of the European Commission, of the exchange rate criterion has been that EMU candidates will have to join an ERM II arrangement, with ±15 percent fluctuation bands around a fixed central parity vis-à-vis the euro, for two years prior to joining EMU. There is also the institutional requirement that the central bank be independent.

candidate EU members will have to take on board. However, whether and when the Maastricht criteria are satisfied will be to a significant extent at the discretion of the candidate members. Sweden, for instance, does not have an EMU derogation but has thus far evaded the obligation to join EMU by choosing not to satisfy the ECB's (and until recently the European Commission's) interpretation of the exchange rate criterion: successful membership in the Exchange Rate Arrangement, presumably the ERM II variant, for a period of at least two years.

Assuming that membership of EMU is a goal, it should still be kept in mind that the Maastricht criteria do not put very severe restrictions on the type of monetary and exchange rate regime that may be adopted beforehand, as long as the implications of real convergence for the behaviour of the equilibrium real exchange rate are disregarded. Floating within a band or symmetric target zone measuring no more than 15 percent from a euro central rate, with intervention at or within the margins of the band, is permissible. Definitely permissible under the Maastricht exchange rate criterion are a conventional fixed exchange rate regime and a currency board with the euro (4).

The exchange rate regime is a key determinant of a country's macroeconomic stability.

The purpose of this paper is to review the options for accession countries taking into account the implications of real convergence. It is structured as follows. The next section reviews the current practice of monetary and exchange rate regimes in accession countries. Section 3 discusses the pros and cons of variants of the fixed exchange rate option, while Section 4 turns to a critique of flexible exchange rate arrangements. In Section 5, we review the impact of intersectoral productivity growth differentials in the accession countries on the real appreciation of their exchange rates, and the consequent implications for meeting the EMU inflation and exchange rate criteria. Section 6 concludes the paper with a practical suggestion for an efficient EMU entry procedure for successful EU accession countries. It is that each accession candidate should ideally be allowed to euroise at the earliest possible date, not unilaterally, but at an exchange rate that is negotiated and agreed upon between the responsible parties in the existing EMU member states and the candidate country. Furthermore, candidate countries should become EMU members at the earliest possible date, possibly (and preferably) on the same date on which they become EU members. Certain technical wavers or derogations from the Maastricht exchange rate or inflation criteria may be judged to be necessary for early accession. It is our recommendation that these be granted. Simply put, we view national monetary sovereignty for small economies, highly open to trade and financial flows - the case of each of the accession candidates - to be an expensive and unnecessary luxury.

2. Current practice

Among the ten Central and Eastern European accession candidates, three have a currency board (Bulgaria and Estonia with respect to the euro, Lithuania originally with respect to the USD, changed to the euro on February 2, 2002), Latvia has a conventional fixed exchange rate regime with a peg against the SDR, Hungary a target zone with a central rate fixed against the euro and a ±15 percent fluctuation band plus an inflation target. The remaining five countries have a managed float. Managed floats cover a wide spectrum of possibilities as regards the ultimate nominal anchor. Among the five managed floaters, the Czech Republic has an inflation target net of administered prices, the Slovak Republic has a core inflation target, Poland has a headline inflation target and

4) Any of the previous regimes could be combined with the adoption of the euro as a parallel, i.e. competing, currency. Under such a scheme the euro would be joint legal tender with the domestic currency providing additional monetary discipline - see Buiter and Grafe (2001) for further discussion.

Slovenia has an M3 growth target. The Romanian central bank has price stability as its primary mandate, but does not have an inflation target.

In addition to having differing exchange rate regimes, the ten accession candidates differ somewhat in their approaches to the international mobility of financial capital, although all have liberalised at least some types of capital account transactions (5). The Czech Republic, Hungary and the Baltic States have effectively freed financial investment flows, but have kept some restrictions in categories like real estate transactions. Poland, the Slovak Republic and Slovenia have also kept a number of restrictions on financial flows at short maturities.

Motivations for imposing capital controls differ among countries and instruments. So does their effectiveness. Controls on short-term capital flows are often motivated by the desire to avoid sudden large shifts in capital inflows or outflows, which could threaten exchange rate stability and/or undermine the liquidity or solvency of domestic financial institutions. Restrictions on the purchase of land or real estate by foreigners tend to be motivated by non-economic considerations.

The "short-term" in "short-term capital flows" refers to the remaining time to maturity (or sometimes to the original maturity) of the financial instrument, not to the expected holding period of the investor. If there are liquid secondary markets for long-dated financial instruments, high frequency reversals of capital flows do not require the presence of short-term internationally traded securities. Even foreign direct investment (FDI) is, in principle, easily reversed, if there is a liquid and deep market for ownership claims (equity). Nor does the absence of a large stock of short-term foreign currency liabilities or the absence of significant non-resident ownership of domestic financial claims provide reasons for feeling relaxed about speculative attacks on the currency. What matters here is the capacity or ability (of resident and/or non-resident economic agents) to go short in the domestic currency and to go long in foreign exchange in any of a wide range of spot, forward or contingent claims markets.

The manner in which capital has entered a country need bear no relationship to the manner in which it can leave.

The manner in which capital has, in the past, entered a country need bear no relationship to the manner in which capital can, at some later date, leave the country. Take, for instance a country like Poland, which has recently financed its external current account deficit mainly through FDI, including privatisation receipts (that is, the capital account in recent years showed net inflows of FDI of a magnitude similar to the current account deficit). Does the fact that past current account deficits were largely financed by inflows of FDI make a sudden capital flows reversal less likely? Not if the FDI importing country has removed virtually all administrative obstacles to international financial capital mobility. In that case, a speculative attack against the domestic currency need not involve a reversal of FDI flows. Instead it could occur through large scale outflows of short-term (or long-term) portfolio capital.

While the range of financial instruments that can be traded internationally by the accession candidates remains fairly narrow, it is wide enough to expose each one of the accession countries to the threat of sudden, large reversals in capital flows. This vulnerability will soon become even greater because accession to the EU will require a further opening of the capital account. According to Article 56 of the Treaty on European Union, member states are required to fully liberalise their capital accounts both with regard to other member countries and with regard to third countries. If formal participation in ERM II is

5) Note that all countries have adopted IMF Article VIII, which proscribes controls on current account transactions.

a condition for entry into EMU, this opening of the capital account on accession may well come about at the same time that (some of) the accession countries might want to enter ERM II to qualify for EMU membership at the earliest possible date. The experience of ERM I under free capital mobility was not very encouraging. ERM II under free capital mobility might likewise turn out to be destabilising and risky.

3. Is there a credible fixed exchange rate regime?

What is the appropriate exchange rate regime for each of the accession countries? Box 1 explores the issue from the perspective of the Optimal Currency Area literature. It concludes that arguments against fixed exchange rate regimes in the accession countries based upon conventional OCA considerations are over-stated. Against this background, this section examines fixed exchange rate options, before turning to free floating in Section 4.

Monetary union and political union

Credible fixed exchange rate regimes range form monetary and political unions to currency boards with a sound exit strategy.

No fixed exchange rate regime can be absolutely and unconditionally credible. Even a full monetary union or common currency area can break up. A minimal common, i.e. supranational set of political institutions (Parliament, Court, a proto-executive), covering all nations in the monetary union appears to be a necessary condition for its long-term survival (6). Thus, when considering monetary unions it is important to distinguish between, on the one hand, (formally) symmetric monetary unions, and, on the other hand, asymmetric or unilateral monetary unions. A symmetric monetary union has a monetary authority that satisfies the following conditions:

- Its mandate spans the entire monetary union (e.g. price stability for the monetary union as a whole)
- It acts as lender of last resort on the same terms in every union member state
- Seigniorage is shared fairly among all union member states
- It is accountable to the legitimate political representatives of the citizens of the whole union.

Under these criteria we can see that EMU is a (formally) symmetric monetary union. Conversely, the recent dollarisations of Ecuador and El Salvador, the long-standing dollarisation of Panama and the euroisations of Kosovo and Montenegro are examples of asymmetric or unilateral monetary unions.

It is easier for a country that has unilaterally adopted another currency to give up its unilateral commitment to the monetary union, than it is for a country that belongs to a formally symmetric monetary union to leave the monetary union. Furthermore the potential gains to remaining in the union are larger for a member of a formally symmetric monetary union. A member country of a formally symmetric currency union can to a certain extent influence monetary policy in the union while a country that has adopted the currency unilaterally has to live with whatever is decided somewhere else. Thus introducing a national currency entails a larger gain for the latter. The formally symmetric monetary union therefore represents the most credible fixed exchange rate arrangement.

6) Examples of failed monetary unions whose members never achieved any significant degree of political union include the monetary union of colonial New England, the Latin Monetary Union, the Scandinavian Monetary Union and the East African Currency Area. There are also numerous examples of break-ups of monetary unions once the political institutions that backed it were dissolved. When the South seceded from the Union, the Confederacy introduced its own currency. The successor states to the Austro-Hungarian empire could not sustain a currency union following the break-up of the empire after World War I. The same fate befell the CIS ruble zone following the demise of the Soviet Union, and the dinar zone following the break-up of the Federal Socialist Republic of Yugoslavia.

Box 1. An Optimal Currency Area Perspective

Nominal cost and price rigidities: If there are no significant nominal cost and price rigidities, the exchange rate regime is a matter of supreme macroeconomic insignificance. Note that it is only nominal rigidities that matter. A country can be mired in real rigidities (rigid real wages, stagnating productivity, immobile factors of production) and its real economic performance will be miserable, without this having any implications for the choice of exchange rate regime. Unless these real rigidities can be addressed effectively through nominal exchange rate variations, the country's performance will be miserable with a credible fixed exchange rate, with a floating exchange rate, or with a system of universal bilateral barter.

The severity and persistence of nominal rigidities therefore becomes a key empirical and policy issue. Unfortunately, the available empirical evidence is extremely opaque and very hard to interpret. This leaves us in an uncomfortable position. We believe the *numéraire* matters, although we cannot explain why (using conventional economic tools). We believe that nominal wage and price rigidities are common and that they matter for real economic performance, but we do not know how to measure these rigidities, nor how stable they are likely to be under the kind of policy regime changes that are under discussion.

Size, openness and direction of trade: The relevant metric for 'size' in economics is market power. A large country has the ability to influence its external terms of trade (the relative price of exports and imports) or the world prices of the financial securities it deals in (the world rate of interest). From this perspective, even Poland, the largest of the ten accession countries is small. A country that is small as regards trade in goods and services (a price taker in the world markets for imports and exports) cannot use variations in its nominal exchange rate to affect its international terms of trade. Of course, not all final and intermediate goods and services are internationally traded. Labour services in particular are overwhelmingly non-traded. Nominal wage rigidities are therefore sufficient to give the nominal exchange rate a (temporary) handle on the real economy, through its ability to influence relative unit labour costs and profitability.

A common theme in most Optimal Currency Area approaches is that an economy that is more open to trade in goods and services gains less from nominal exchange rate flexibility. It should be obvious that this proposition cannot be correct as stated. For an economy that is completely closed to trade in goods and services, the exchange rate regime is irrelevant, from the point of view of macroeconomic stabilisation. If there is a relationship between degree of openness and the cost of giving up exchange rate flexibility, the relationship cannot be monotone.

Most of the countries in Central and Eastern Europe are much more open to trade today than Greece, Portugal and Spain were when they became members. While trade (imports plus exports) accounted for 62% of GDP on average among this latter group, the ratio is almost twice as high for five of the accession countries (Czech Republic, Estonia, Hungary, Poland and Slovenia) and hardly lower for the others. For example, Poland is much more open than Spain was when it joined the EU. Moreover, all accession countries conduct a large share of their trade with countries in the euro-zone. Thus, the likelihood of these countries being hit hard by an external trade shock originating from a country or region outside the EU is rather small.

Asymmetric shocks or transmission: The 'one-size fits all' monetary policy corset inflicted on the members of a monetary union is most costly if a member state is subject to severe asymmetric shocks or if its structure is such as to cause even symmetric or common shocks to have seriously asymmetric impacts on output and employment.

Identifying and measuring the shocks perturbing the accession countries in the past is an exercise undertaken only by the brave. The further assumption that the patterns revealed in the historical sample would remain valid in the future, pre- and post-accession, is difficult to justify.

However, there are three considerations that qualify the proposition that asymmetric shocks make the retention of nominal exchange rate flexibility desirable. Nominal exchange rate changes are the appropriate response only to asymmetric shocks to the markets for goods and services, that is, to IS shocks and aggregate supply shocks. In response to asymmetric monetary shocks (LM shocks), a constant nominal interest rate is appropriate. In a world with perfect international financial capital mobility, a constant nominal interest rate translates into a constant expected rate of exchange rate depreciation. A credible fixed exchange rate is the simplest way of delivering this optimal response to LM shocks.

Second, it is important not to be excessively impressed with the efficiency of financial markets in general, and with the efficiency of the foreign exchange market in particular. The foreign exchange market and the exchange rate can be a source of extraneous shocks as well as a mechanism for adjusting to fundamental shocks. One cannot have the one without the other. The potential advantages of nominal exchange rate flexibility as an effective adjustment mechanism or shock absorber are bundled with the undoubted disadvantages of a market-determined exchange rate as a source of excessive noise and unwarranted movements in the exchange rate, inflicting unnecessary real adjustments on the rest of the economy.

Third, if one takes the view that full international financial market integration requires a common currency, then the argument can be made that asymmetric (real) shocks strengthen the case for a common currency. The argument is that full diversification requires a credible fixed exchange rate, and that the ability to diversify internationally, and to share risk internationally is most valuable when shocks are asymmetric. With common shocks, there can be no risk sharing. Diversification is pointless.

Limited real resource mobility: It is clear that a high degree of real factor mobility can, in principle, be an effective substitute for nominal exchange rate adjustments in the face of asymmetric shocks. Indeed, factor mobility permits long-term, even permanent, real adjustments to asymmetric real shocks, something nominal exchange flexibility cannot deliver. The real factors whose mobility matter are labour and physical capital.

Physical capital mobility is limited, even when financial capital mobility is perfect. Once real capital (plant, machinery and other equipment, infrastructure etc.) is installed it becomes costly to shift geographically. However, technological developments of the past few decades may make this argument progressively less applicable. While a blast furnace is likely to be prohibitively expensive to move, many modern assembly lines for high-tech products are extremely valuable in relation to the cost of moving them. They can be, and are, moved over large distances in response to changes in relative costs of production (or to changes in the other determinants of profitability).

There are many obstacles to labour mobility between the accession countries and the current EU including linguistic, or legal and administrative barriers. Whatever these obstacles, the net migration flows between any two regions or countries are bound to be larger the larger the difference between their real wages. However, the difference in living standards only tells us something about the possible size of structural, long-term net migration between accession countries and the existing EU member states. It does not say anything about the size of net labour flows at business cycle frequencies. It is the latter kind of cyclical labour mobility that would have to take over the role of the exchange rate as a short-term shock absorber if nominal exchange rate flexibility is given up. There is no evidence, even in countries with a high degree of structural labour mobility, such as the USA, that net labour mobility has

a significant cyclical component. This suggests that either cyclically sensitive labour mobility is not required for a successful monetary union, or that the USA should not be a monetary union.

Supranational fiscal stabilisation: Is a supranational budgetary authority with serious redistributive powers, spanning the existing EMU members and the accession countries, necessary to make up for the loss of the exchange rate instrument if the accession countries were to adopt a currency board vis-à-vis the euro, or, in due course, were to join EMU? The brief technical answer is 'no'. Fiscal stabilisation policy works if and to the extent that postponing taxes, and borrowing to finance the resulting revenue shortfall, boosts aggregate demand. This will be the case either if there is myopia among consumers, who fail to realise that the present value of current and future taxes need not be affected by the timing of taxes, or if postponing taxes redistributes resources between households with different propensities to consume.

Unless the supranational federal fiscal authority in a currency union has access to the global financial markets on terms that are superior to those enjoyed by the national fiscal authorities, there is nothing the federal authorities can achieve by way of fiscal stabilisation that cannot be achieved equally well by national or even lower-tier fiscal authorities. National government financial deficits and surpluses, probably mirrored to some extent in national current account imbalances, are a perfect substitute for supranational fiscal stabilisation.

We conclude that

- many of the Optimal Currency Area arguments are overstated and the traditional analysis focuses too much on trade linkages rather than capital account linkages.
- it is quite difficult to argue that the accession countries are less good candidates for membership in the common currency area of EMU than many of the existing member countries.

Currency boards: No entry without exit

Unilateral euroisation is the limiting case of a currency board.

After the symmetric and the unilateral monetary unions, the next most credible fixed exchange rate regime is a currency board. A currency board is defined by two rules: an exchange rate rule and a budgetary or fiscal rule. The exchange rate rule is a commitment to a fixed peg in terms of some currency or basket of currencies. The fiscal rule is the requirements that there can be no domestic credit expansion by the central bank, that is, there must be (at least) 100 percent international reserve backing of the monetary base. In the simplest case, foreign exchange reserves are the only financial asset of the monetary authority, with the monetary base (currency in circulation plus commercial bank reserves held at the central bank) the only financial liability. Unless stated otherwise, we consider only a single currency peg vis-à-vis the euro. The euro could, but need not, be legal tender in the country operating the currency board. Unilateral euroisation is the limiting case of a currency board that has the euro as joint legal tender, when the use of the local currency, as a unit of account, a means of payment and a store of value, has shrunk to nothing.

Many variations on the pure currency board model have been implemented in practice (see for example Ghosh, Gulde and Wolf, 2000). Most involve adding financial instruments to the asset and/or liability menu of the monetary authority or adding off-budget and off-balance sheet contingent claims. For instance, domestic commercial banks could have contingent credit lines with

the monetary authority; the monetary authority could have contingent credit lines with foreign financial institutions, private or public; and the monetary authority could have limited authority to extend credit to the government and/or the private sector. Each relaxation of the strict currency board model moves it closer to the traditional central bank managing the oxymoron of a 'fixed-but-adjustable' peg.

The credibility of a currency board depends on the cost of abandoning it.

The credibility of a currency board depends on the difficulty and cost of abandoning it. The costs are probably mainly reputational. It is also possible that the abandonment of a currency board could involve the domestic private sector, and even the government or its agents, in costly litigation for alleged breach of contract. A currency board created under a government decree is more easily abandoned than one established by law. A currency board established by law is more easily abandoned than one enshrined in the constitution. But ultimately, anything that has been made politically can also be unmade politically. The cost of abandoning a currency board may be higher than the cost of abandoning a conventional peg, but it is certainly not high enough to rule out that contingency. Ireland abandoned its currency board with the UK in 1979 and Argentina abandoned its currency board in December 2001.

One argument in favour of a currency board is that, compared to a full-fledged central bank, it is a cheap way of managing monetary policy. All that is needed is a sufficient number of modestly skilled bank clerks who exchange, at a fixed rate, domestic currency for the foreign currency or basket of currencies in terms of which the peg is defined. Of course, banking supervision and regulation still are required, but these activities need not be undertaken by the monetary authority. Under a currency board, the regulator/supervisor can only rely on the sticks of public disapproval, fines or prosecution. The carrot of a financial safety net, should a liquidity crisis hit, is no longer available, as neither the regulator/supervisor nor the monetary authority can expand domestic credit at their discretion in response to such a contingency.

A second argument in favour of a currency board is that it is a strong, 'double-barrelled' commitment device. Through the currency peg it represents a commitment to price stability. Through the 'no domestic credit expansion' constraint, it represents a commitment to budgetary restraint. The value of these commitments depends either on the currency board arrangement being perceived as credible and permanent, or on the belief that, if it is abandoned, it will be replaced by something representing a comparable commitment to price stability and budgetary responsibility as a credible currency board.

These considerations permit us to specify some key characteristics that any currency board must satisfy for it to be stability-enhancing rather than instability-amplifying:

- First, a currency board arrangement must be recognised as temporary, and there must be a strong exit strategy. As the only exchange rate regimes that are sustainable in the long run are a floating exchange rate and a formally symmetric common currency or monetary union, these two regimes also define the two possible strong exits from a currency board. Note that a currency board is as vulnerable to speculative attacks as any fixed exchange rate regime. The notion that it is safe (or at least safer) because the stock of international reserves is at least as large as the domestic monetary base is mistaken. The magnitude of the portfolio shift out of domestic currency-

denominated assets into foreign exchange is not limited by the outstanding stock of domestic base money. At the most basic level, foreign currency-denominated bank deposits with domestic banks can be swapped into foreign currency instantaneously. If it is possible to borrow domestic currency to go long in foreign exchange, the scope for speculative attacks is further enhanced. To discourage this, sky-high domestic interest rates would be required. The only way to prevent a foreign exchange crisis would be a fully credible commitment by the monetary authorities to raise domestic interest rates to whatever level might be required to safeguard the currency peg. Such a commitment to bring about, if necessary, a banking crisis, and even, if the speculative pressures were to persist, a general financial crisis, a public debt crisis, or a full-fledged economic crisis, has not been credible, since the middle of the 20th century. If the peg is not credible, and a weak exit is likely, domestic-currency-denominated financial instruments will carry a premium reflecting the expected rate of depreciation of the home currency. The 'peso-paradox', by raising the nominal and real cost of borrowing through domestic currency-denominated debt instruments, can put additional stress on public and private budgets (7).

Conditions must be right for currency boards to be stability-enhancing rather than instability-amplifying.

- Second, no country should consider a currency board unless it can afford to do without a lender of last resort. One obvious drawback of a currency board is that there can be no lender of last resort, since domestic credit expansion by the monetary authority is ruled out (see Chang and Velasco, 1998; Della Paolera and Taylor, 1999). There may be ways of partially privatising the lender of last resort function by arranging contingent credit lines, but the scope for that is inevitably limited. This means that a currency board should not be considered unless the banking system (and indeed the financial system in general) is solvent and strong, and there are institutions and mechanisms other than the lender of last resort function of the traditional central bank for dealing with bank runs and other liquidity crises.

- Third, no country should consider a currency board unless it has a sound fiscal framework that will not require discretionary access to central bank financing by the general government. A nation adopting a pure currency board throws away the key to the drawer labelled 'monetary financing of government budget deficits'. In a well-run economy, with a benevolent, competent and credible policy maker, this would actually be a drawback (see Calvo and Leidermann, 1992). Seigniorage can be a useful source of revenue for cash-strapped governments. There is no reason to believe that the inflation rate generated under a currency board is anywhere near the optimal rate from a neoclassical public finance point of view (which assumes a benevolent and competent monetary authority, which is capable of credible commitment). However, political economy considerations, distilled from the often brutal lessons of history, suggest that the printing press is a great seducer, and that the freedom to issue monetary liabilities at will is likely to be abused. Using the rather blunt instrument of an outright ban on domestic credit expansion by the central bank may therefore be desirable if the alternative is the opportunistic abuse of the power of the printing press by myopic and/or self-serving governments. Without a sustainable fiscal programme, interest rates on domestic public debt (both domestic- and foreign-currency denominated) will be higher because of a default risk premium. As default risk increases, quantity rationing will constrain the government's ability to borrow.

7) The 'peso-paradox' refers to the phenomenon of a fixed exchange rate regime with unrestricted financial capital mobility which produces a domestic interest rate that persistently exceeds the foreign interest rate. This is consistent with financial market efficiency and rational expectations, if there is a (small) probability of a collapse of the peg followed by a substantial currency depreciation, and this (rare) event has not (yet) occurred in the sample.

- Fourth, the currency or basket of currencies involved in the peg should be appropriate from the point of view of the country's external trading pattern. Changes in the nominal effective exchange rate are potentially effective means of effecting a necessary change in international relative price or cost levels. Pegging the nominal exchange rate to a currency or basket of currencies that has but a small weight in the country's effective exchange rate index is therefore unlikely to be wise.

Argentina failed on criteria (1), (3) and (4). The currency board had been presented and defended as a permanent arrangement. There also was no chance of a strong exit to membership in a formally symmetric monetary union with the USA. There are no common, supranational institutions spanning the USA and Argentina that would make such a symmetric monetary union possible. Unilateral dollarisation may be a short-run temptation, but it is not a viable long-run option. If unilateral dollarisation were to occur, the first populist President elected, with a parliamentary majority, following the event will re-introduce a national Argentine currency, partly for symbolic reasons and partly to get hold of the seigniorage. Argentina never solved its fiscal federalism problems, nor did it tackle effectively the problem of overall limited revenue raising capacity and strong public sector unions. Finally, the US accounted for less than 10 percent of Argentina's exports and imports (8).

There are also interesting parallels here with Turkey before the collapse of its currency regime in February 2001. Turkey did not have a currency board, but it did have something very close to it, something that could be called a 'crawling peg board'. Like a currency board, Turkey's monetary regime ruled out domestic credit expansion by the central bank. The exchange rate was not fixed, but depreciated at a predetermined rate. Turkey failed criteria (1), (2) and (3). It had no strong exit strategy. Membership in a formally symmetric currency union, that is membership in EMU, is a long-term ambition, not a medium-term possibility. The Turkish banking system was very weak, and there were long-lasting unresolved fiscal problems. The burden of the internal public debt was high and rising fast. The country had been involved in 16 earlier IMF programmes, each of which had failed. Unlike Argentina, the composition of the basket in terms of which Turkey's crawling peg was defined, did reflect the country's international trading patterns.

...and for the Accession countries?

From an economic point of view, euroisation or a currency board with the euro can make sense for the ten, small, highly open accession candidates. An accession candidate opting for a currency board with the euro would be pegging to a currency that accounts for the lion's share of its external trade.

With the future exit into EMU, accession countries meet the conditions for successful currency boards.

An accession country with a currency board involving a peg to the euro would have a natural 'strong exit' in the form of EMU membership, preferably on the same date that EU membership is achieved (9). Even the stragglers in banking sector reform, such as the Czech Republic, are now engaged in a determined effort at financial and 'real' restructuring of their banking sectors. This eliminates a further obstacle to a currency board. Finally, while fiscal restraint, like chastity, is something that has to be fought for every day, the accession candidates of Eastern and Central Europe appear to be in no worse budgetary shape than the majority of the existing EU and EMU

8) There could have been a strong exit into a free float-cum-inflation targeting in the mid-1990s, but this moment passed.
9) To adopt the euro at the same time as, or even before, the accession candidate becomes an EU members would, of course, require a waiver, derogation or re-interpretation of part of the exchange rate criterion in the Maastricht Treaty - the requirement that a country be a successful ERM member for 2 years before it can become an EMU member.

members. This precondition for a successful currency board therefore appears to be satisfied also. It is important that the additional pressures on public sector budgets caused by spending to meet the demands of the *acquis communautaire*, especially in the environmental and infrastructure fields, do not jeopardise the fiscal stability of the accession candidates.

4. Free floating

As we have mentioned, free floating is nowadays widely regarded as the only other credible exchange rate regime in the long run. We restrict the discussion here to the particular variant of free floating-cum-inflation targeting. Inflation targeting has been 'en vogue' in most industrialised countries for quite some time. Although the US Fed does not officially and formally target inflation, its actual operating procedures under Volcker and Greenspan have mimicked inflation targeting. The Bank of England has had an inflation target since 1992 and the ECB has, since its launch in 1999, had an inflation target that dare not speak its name (10). New Zealand, Australia and Canada also use inflation targeting. So, why not the accession candidates?

Key requirement for effective inflation targeting

Although there are quite a few differences among the ways in which inflation targeting can be designed and implemented, there is a common core of key requirements for effective inflation targeting for all viable variants. This goes well beyond the government announcing some short-term inflation target. This common core consists of the following:

- The public announcement of a numerical medium-term target for inflation for a clearly defined and easily monitored index for a representative basket of goods and services.
- An institutional commitment to price stability as the primary goal of monetary policy to which other goals are subordinated.
- A credible toolbox for linking monetary instruments to medium-term inflation outcomes that makes use of all the information available.
- Legitimacy of the monetary arrangements and transparency of the monetary policy strategy. This requires accountability of the monetary authorities to the elected representatives, open and transparent procedures, and effective communication with the public and the markets.

In principle, flexible exchange rates give scope for independent monetary policy...

Inflation targeting is said to have the key advantage that a country can keep control over its monetary policy, which is, according to conventional optimum currency area theory, desirable in the presence of asymmetric (non-monetary) shocks. Nevertheless, in many countries it has proven quite difficult to exploit this advantage.

Monetary independence through a floating exchange rate permits flexibility (the valuable ability to respond to shocks), but the downside of this flexibility are, first, opportunism, that is, discretion in the negative sense of lack of credible precommitment and, second, vulnerability to exchange rate shocks. Opportunistic discretion has been discredited by the inflationary experience of the 1970s, and 'rules based' monetary policy, that is, monetary policy based on credible precommitment, is

10) The official ECB position is that it has a medium-term price stability target. An inflation rate (for the HICP index) between zero and two percent per annum is deemed consistent with the price stability target.

...but actual benefits of monetary independence may be limited.

advocated by all main-stream economists. Of course, rules can, and should, in principle, be flexible, contingent rules that permit a response to news. But it is also true that the benefits of monetary independence in most accession countries should not be overstated. In addition to the universal problems of instrument uncertainty, monetary policy in the accession candidates is particularly unlikely to be very effective in stabilising output because credit, deposit and debt markets are still rather underdeveloped. Furthermore, especially in the less advanced countries, a substantial share of credits and deposits continues to be in foreign currency. Thus, changes in the cost and availability of domestic credit are unlikely to have a large immediate effect on output, either through the interest rate or through the credit channel.

Accepting inflation as the overriding goal of monetary policy and giving up the goal of stabilising the exchange rate can have important repercussions for the banking system. Especially in the less advanced countries of the region, large parts of the balance sheets of banks are denominated in dollars and other hard currencies. Even if the balance sheet of the bank itself is balanced as regards its foreign currency liabilities and assets, this need not be adequate insurance against loss in case of large fluctuations in the exchange rate. A large depreciation may lead to defaults by parties that have borrowed from the bank in hard currency without matching the currency denominations of their own debits and credits. Such borrower defaults can have a knock on effect on the banking system (11).

A further important requirement for successful inflation targeting is the institutional commitment of the central bank to the aim of price stability. This involves the insulation of the policy-making board of the central bank from the partisan, party-political process. Members of the policy-making board of the central bank should not have close ties to political parties or factions. They should be appointed for a single term in office, which should be longer than the political cycle. Much of the success of the inflation targeting central banks depends on reputation. While this does take time to establish, the experience of the Bank of England has shown that it is possible to quite rapidly gain the trust of the financial markets through a combination of transparency and active engagement in explaining policy decisions to the public.

Which target?

Over recent years much research has gone into the question of what constitutes the optimal inflation target. This involves the composition of the target basket, the horizon over which the target is to be pursued, and the numerical value assigned to the target. Currently the Czech central bank targets net inflation (inflation stripped of administrative prices and the effect of tax changes) (12) for up to 30 months ahead. The Polish central bank instead targets headline inflation for at most 18 months ahead. The consensus for very open economies appears to be that ideally the central bank should target a medium-term inflation target that filters out temporary variations in the inflation rate, such as those due to transitory exchange rate movements. The advantages of this approach over simple consumer price basket targeting are greater the more open the economy is and the more volatile the

11) While a large unexpected exchange rate change can cause default and bankruptcy when there is a significant degree of currency mismatch in the balance sheets of banks, commercial and industrial enterprises and households, such 'real effects' do not, of course, make monetary policy an effective and efficient stabilisation tool.

12) Note that this is easier said than done. Simply stripping administered prices out of the price index is likely to be nonsense. Statistical stripping is not the same as behavioural stripping. The behaviour of the non-administered price component is most unlikely to be independent of the behaviour of the administered prices. For instance, freezing administered prices in an inflationary environment is likely to increase the inflation rate of the non-administered prices.

exchange rate. Paying attention to these issues is the more important the larger and more volatile capital flows are. Especially when domestic financial markets and the foreign exchange market lack depth and breadth, capital flows can easily have large transitory effects on the exchange rate and through that on the domestic currency prices of internationally traded goods and services.

The integration of accession countries into the international financial system makes inflation targeting even more challenging.

The challenges posed by international financial integration will continue to be important for the accession countries, and on balance its effects are likely to be beneficial, provided effective regulation and supervision of domestic financial institutions and markets can be established. With rapidly ageing populations, domestic saving rates are unlikely to be sufficient to finance the capital stock replacement and expansion necessary to catch up with the EU (see Transition Report 2000). FDI inflows are key to the international transfer of technology and know-how. International portfolio diversification offers insurance possibilities against asymmetric shocks that are not available domestically.

The downside of international financial integration is that the international financial market system can be a source of volatility, shocks, and instability. Such financial instability is of course not eliminated when a country joins a monetary union which encompasses most of its external trade in goods, services and financial instruments. Exchange rate instability, however, is a significant part of total financial instability. Exchange rate volatility is reflected in import price volatility and temporary variations in the rate of inflation. This effect is stronger the more open the economy is to trade in goods and services. Undue sensitivity of domestic monetary policy to such short-term movements in the inflation rate can be destabilising for the real economy. Skilful monetary targeting filters out the noise in the observed price, exchange rate and inflation signals, and extracts the signal concerning the underlying inflation rate. It is sometimes argued that if highly open transition economies target inflation, they should target 'domestically generated inflation'. Unfortunately, there is no conceptually clean way of separating imported and domestically generated inflation.

Where does this discussion leave the accession countries? Given the short and often turbulent time period since transition started, the central banks in the region are still in the process of accumulating the reputational capital that is needed for effective inflation targeting. With the monetary and financial systems undergoing rapid transformations, the monetary transmission mechanisms are both poorly understood and quite unstable, which increases the likelihood that central banks in the region may miss the announced inflation targets. This will make it difficult for them to improve their reputations. The strength of the political commitment to central bank independence remains questionable in quite a few accession candidates. Even if no further challenges to central bank independence occur, it will take time for markets to become assured of the independence of the central banks. Also, given the size and volatility of capital flows compared to these countries' GDP, transitory exchange rate movements are likely to be large but difficult to strip out of the inflation series. Thus, it is difficult to argue that these countries are currently good candidates for inflation targeting.

5. Balassa-Samuelson meets the EMU inflation and exchange rate criteria

There may be a conflict between a key structural feature of the accession countries and the inflation and exchange rate criteria for EMU membership. We will show that, unless the inflation criterion is relaxed or reinterpreted for accession countries adopting a currency board (or any other credible fixed exchange rate regime), EMU may only be achievable at the expense of an unnecessary

recession in the accession countries. Likewise, for those candidate EMU members that adopt a floating exchange rate, it is likely to be necessary for the exchange rate stability criterion to be interpreted asymmetrically if the inflation criterion to be satisfied. That is, unlike significant exchange rate depreciations, significant exchange rate appreciations should be permitted during the two year 'probationary period'(13).

Together, the exchange rate criterion and the inflation criterion restrict the scope for changes in the real exchange rate of the accession candidate vis-à-vis the euro-zone. To have, say, a real appreciation requires either a nominal appreciation (if accession country and the euro-zone inflation rates are the same) or a higher domestic rate of inflation relative to the euro-zone (holding the nominal exchange rate constant).

There are several channels that can give rise to real appreciation of the exchange rate during times of catch up - including the Balassa-Samuelson effect.

Real exchange rates of transition economies are volatile and subject to large medium-term swings. There can be little doubt, however, that for most accession countries, there must be the expectation, as part of the process of transition and catch-up in productivity and living standards, of a significant trend appreciation of the real exchange rate. The reason for this belief is the Balassa-Samuelson effect. This is explained in Box 2 (14). In a nutshell, relatively faster productivity growth in the traded sector of the accession countries will convert into a higher inflation rate if the exchange rate is kept constant.

Several authors have recently estimated the empirical magnitude of the impact of the Balassa-Samuelson effect on the real appreciation of accession countries' currencies. De Broek and Slok (2001) estimate in a panel regression that a one percentage point increase in the relative productivity levels of the industrial sector in accession countries compared to the EMU area increases (appreciates) the real exchange by 0.4 percent. Given this point estimate, they find that the catch-up of productivity in accession countries currently causes a real appreciation of around 1.5 percent per annum on average for all the accession countries. Given the dispersion of productivity growth differentials across countries, the effect is significantly stronger for some countries.

Jakab and Kovacs (1999) estimate the effect on Hungarian data and find about 1.9 percent per year for Hungary over their sample period. Rother (2000), analysing Slovenian data, puts the effect at 2.5 percent per year. All these estimates have the obvious shortcoming that they are done on very short data sets, that do not allow the authors to filter out some of the cyclical factors. Subject to that caveat, estimates of the impact of the Balassa-Samuelson effect on the recent real appreciation of the Central and Eastern European currencies against the euro appear to be in the range of 1.5 to 2.5 percent per annum. Thus, at constant exchange rates, this appreciation would raise annual inflation rates in accession countries by 1.5 to 2.5 percent compared to the EMU average, and by even more compared to the best three performing EMU countries (which the Maastricht criterion is based on).

13) The exchange rate criterion does indeed only require that a Member State shall not have devalued its currency on its own initiative for a two-year period. Revaluations are not mentioned explicitly. While this asymmetry in the treatment of devaluations and revaluations may be good news from the perspective of a country wishing to qualify for EMU membership, it raises concerns about a possible lack of symmetry in the interpretation of the price stability target by the ECB. Unlike the Bank of England, whose inflation target and 'open letter procedure' are both explicitly symmetric, it is not clear whether the ECB frowns equally on price inflation and price deflation.

14) See also Samuelson (1994), and Heston, Nuxoll and Summers (1994).

Box 2. The Balassa-Samuelson effect

Let π_T^A denote the inflation rate of traded goods prices in the accession country, π_T^E the inflation rate of traded goods prices in the euro-zone and ε the proportional rate of depreciation of the accession country's currency vis-à-vis the euro. Assume that the law of one price holds for traded goods, that is, the forces of international trade arbitrage equalise the prices of traded goods and services (expressed in a common currency) between the euro-zone and the accession candidate. Then:

$$\pi_T^A = \pi_T^E + \varepsilon$$

The inflation rate relevant for the inflation criterion for EMU membership is the inflation rate of a broad-based consumer price index, which includes both traded and non-traded goods. Let π^A and π_N^A be the CPI inflation rate and the non-traded goods inflation rate in the accession country, and $\pi^E$and π_N^E be the same two variables in the euro-zone. The share of non-traded goods in the consumption bundle is α both in the accession country and in the euro-zone. It follows that

$$\pi^i = \alpha\pi_N^i + (1-\alpha)\pi_T^i \qquad i = A,E$$

The prices of both types of goods are determined as constant proportional mark-ups on unit labour costs. Assume the growth rate of wages within a country is the same for both sectors and that the proportional mark-up on unit labour costs is constant. The growth rate of money wages in country i is w^i and the sectoral productivity growth rates are denoted g_N^i and g_T^i, $i = A,E$. It follows that

$$\pi^A - \pi^E = \varepsilon + \alpha[(g_T^A - g_N^A) - (g_T^E - g_N^E)]$$

Thus, under reasonable assumptions, the difference between the CPI rates of inflation in an accession country and the euro-zone equals the proportional rate of deprecation of the nominal exchange rate plus the (common) share of non-traded goods in the consumption basket, multiplied by the excess of the productivity growth differential between the traded and non-traded goods sectors in the accession country over that same sectoral productivity growth differential in the euro-zone. It seems likely that the differential between productivity growth in the traded goods sector and productivity growth in the non-traded goods sector is larger in the candidate accession country than in the euro-zone, because productivity catch-up is likely to be faster in the traded goods sector than in the sheltered sector. This means that the relative price of non-traded goods to traded goods will be rising faster in the accession candidate than in the euro-zone. This in turn implies that, at a given exchange rate, the overall inflation rate will be higher in the accession candidate than in the euro-zone.

While we have restricted our attention so far to the Balassa-Samuelson effect as the driving force behind an equilibrium real appreciation of the currencies, the economic literature points out several other channels that can give rise to a real appreciation during times of economic catch-up. For instance, under the reasonable assumption that the tradable sector is more capital-intensive than the non-tradable sector, it is easy to show that a reduction in the difference in the cost of capital in transition countries compared to existing EMU countries will give rise to a real appreciation. For simplicity assume that capital is only used in the tradable sector. A decrease in the cost of capital in the transition country leads, *ceteris paribus*, to an increase in the capital-labour ratio and to an increase in the marginal product of labour in the tradable sector. This in turn raises wages in the tradable sector. Labour mobility across sectors implies that wages in the non-tradable sectors will

have to rise as well. Companies in the non-tradable sector will only be able to pay these higher wages if the relative price of non-tradables compared to tradables rises.

Given these other channels, it is no surprise that Pelkmanns *et al.,* (2000) find a larger equilibrium real appreciation for accession countries, when they base their estimation on relative price levels in accession countries compared to existing EMU member countries rather than on productivity growth differentials. They estimate the annual equilibrium real appreciation to be around 3.5 to 4 percent per annum, which at a constant nominal exchange rate to the euro would easily imply an annual inflation differential above the permitted 1.5 percent in the Maastricht Treaty.

If a candidate EMU member subject to the Balassa-Samuelson effect were to float its exchange rate (possibly within a band), it is unlikely that there would be problems in satisfying the Maastricht criteria for Balassa-Samuelson reasons. Consider the case where monetary policy in the accession country were to keep inflation at a level no more than 1.5 percent per annum above the euro-zone level (15), but the inflation differential warranted by the Balassa-Samuelson effect is greater than 1.5 percent per annum at a given exchange rate and at full capacity. The equilibrium response of the exchange rate would be an appreciation. This could cause the accession country to fall foul of the exchange rate criterion, but only if the Balassa-Samuelson effect were truly massive. The Balassa-Samuelson effect is unlikely to exhaust the 15 percent bands of the ERM in two years, assuming the exchange rate starts off in the middle of the band.

The Balassa-Samuelson effect makes meeting the Maastricht inflation criterion difficult.

Of course, as pointed out earlier, a floating exchange rate regime has other serious drawbacks for the accession candidates. What about Balassa-Samuelson and fixed exchange rates? If, at full capacity utilisation and a fixed exchange rate, the inflation differential were to exceed the 1.5 percent permitted by the Maastricht inflation criterion, the only way the candidate EMU member could meet the inflation criterion at a fixed exchange rate would be to have a transitional recession to depress the inflation rate for at least one year to the level required by the Maastricht treaty. Following EMU membership however, the inflation rate in the former accession country would continue to exceed that of the older EMU members by the margin implied by the Balassa-Samuelson effect, for as long as these intersectoral productivity growth differentials have not converged.

A more elegant solution, permitting the EMU candidate to maintain a fixed exchange rate without incurring an unnecessary recession would be to redefine the inflation criterion of the Maastricht Treaty in terms of the inflation rate of traded goods only. Without such a redefinition, only a waiver or derogation would allow a candidate accession country with a strong Balassa-Samuelson effect to qualify for EMU while maintaining a fixed exchange rate and without incurring an unnecessary recession. But this leads to the question of whether broader derogations from, or more flexible interpretations of, the EMU criteria are not desirable.

6. A practical suggestion

At present, the existing member countries and the ECB maintain the position that (unilateral) euroisation is not compatible with qualifying for EMU membership. The analysis in this paper leads us to the conclusion that a workable, practical solution to the exchange rate regime dilemma faced by those accession countries that are likely candidates for early EU membership, should be to allow

15) Or above the average of the three EMU members with the lowest inflation rates.

them to euroise (at a properly negotiated parity) prior to EMU membership and even prior to EU membership without running the risk of jeopardising eventual full EMU membership (16).

For euroisation or a strong currency peg to be an attractive option for candidate countries hoping for early full EMU membership, it may be necessary to waive or alter the inflation criterion for EMU accession. The reason is that, for Balassa-Samuelson reasons, the process of real convergence could lead to significantly higher inflation rates in accession countries than in the existing EMU area, once the exchange rate is fixed. Thus, without a waiver or alteration of the inflation criterion, the candidate country that euroises (or operates any fixed exchange rate regime, including a currency board) might either have to engineer a temporary, and quite unnecessary, recession to get inflation down for a year or forego EMU membership (17).

Arguments for waiving the Maastricht inflation criterion reach beyond the Balassa-Samuelson effect.

There is a further good reason (distinct from the Balassa-Samuelson effect) to grant an inflation waiver, as observing the inflation criterion (to the extent that this implies an inflation rate that is lower than optimal from the strictly national perspective of the EMU candidate) may involve up-front costs without commensurating prospective benefits. Once a country joins EMU, its medium and long-term inflation profile is determined by the EMU-wide monetary policy and the operation of the Balassa-Samuelson effect. The value of the investment in a reputation for monetary policy competence and for commitment to price stability is sharply devalued when monetary autonomy is given up as a country joins EMU (18). National fiscal policy can still affect national inflation rates, but only transitorily. At most, inflation concerns should therefore imply fiscal constraints (and fiscal coordination). They do not call for an inflation criterion *per se*. Indeed, monetary union is the means *par excellence* for achieving inflation convergence (up to a Balassa-Samuelson differential). To make inflation convergence a precondition for monetary union is putting the cart in front of the horse (19).

What would be the consequence of an accession country joining EMU while its inflation rate is higher than its long-run EMU equilibrium inflation rate? If there is inertia in the accession country's inflation process, the country would become increasingly uncompetitive for as long as its inflation rate exceeded its long-run EMU equilibrium inflation rate. That loss of competitiveness will ultimately be recouped through a period of unemployment in excess of the NAIRU or a period of excess capacity. While regrettable, there are no obvious negative externalities for the existing EMU members from the entry into EMU of a (small) accession country at a rate of inflation that is above

16) The argument why unilateral euroisation is not a permissible exchange rate regime under which to qualify for EMU membership relies mainly on the requirement that the entry exchange rate into EMU should be fixed in negotiation between the candidate and existing member countries. However, we can see little reason why the existing EMU countries should object to euroisation, if the exchange rate at which a country euroises, is fixed in bilateral negotiations between the candidate country and the current EMU member countries.

17) This is actually a dilemma for Brussels and Frankfurt that is unavoidable as there are already candidate countries that have adopted currency boards towards the euro and which could arguably be kept in the cold outside EMU for many years due to the inflation criterion.

18) It is not zero, because, under current rules, a new EMU member's central bank governor will be a member of the ECB Governing Council.

19) A good case can be made that any kind of exchange rate criterion would compel EMU candidates to engage in costly investment with no prospective return. Consider the requirement that a candidate EMU member must satisfy the normal fluctuation margins of the ERM for at least 2 years prior to the decision. As soon as the EMU candidate establishes that it can manage its exchange rate for the required period of time within the assigned bands, the capacity to manage the exchange rate is given up irrevocably and permanently when the country joins EMU. Reputational capital is accumulated, through a costly and risky investment process. This reputational capital is scrapped at the moment the country joins EMU.

its long-run EMU equilibrium inflation rate (20). The decision as to the appropriate inflation rate of the new EMU entrant at the moment of entry can therefore be safely delegated to the new entrant. It also is worth pointing out that we know very little about the persistence of inflation momentum across a change in the currency - the *numéraire*. It is not obvious that, for instance, Polish *zloty* or Hungarian *forint* inflation inertia will, once the *numéraire* of wage and price contracts has switched to the euro, be inherited by euro inflation rates in Poland and Hungary respectively.

Joining EMU is possible without formal ERM membership and can thus become effective at the date of entry into the EU.

We also believe that there is a good economic case for the leading EU candidate countries to become members of EMU as soon as possible, and without having to go trough a two-year period of formal ERM membership. 'Shadowing' the ERM ought to be sufficient. We do not believe that a formal derogation from or waiver of the Maastricht exchange rate criterion is required for this to be possible.

Without a firm ruling that either ERM membership can start before EU membership (which seems implausible) or that it is possible to satisfy the normal fluctuation margins of the ERM without being a formal ERM member (which seems eminently plausible), the accession candidates would face at least a two-year period during which they are members of the EU but not part of EMU. This means that the accession countries would have to manage their exchange rate for a period of at least two years after joining the EU with a completely open capital account - part of the *acquis* requirements.

There will be an unavoidable risk of speculative attacks on the new EU member's currency. Fighting off such speculative attacks is costly. Giving in to them is even more costly. Deferred EMU membership would also defer the microeconomic efficiency gains and the portfolio diversification and financial market deepening benefits from having a common currency. The ability to use variations in the nominal exchange rate to adjust more swiftly and effectively to asymmetric shocks is a greatly overvalued commodity, especially for small and highly open economies. Those who put store in it (and few central bankers do) attribute to the national monetary authorities a capacity for fine-tuning which simply is not present in reality.

Our position that successful EU accession candidates can avoid spending two years (or more) in ERM purgatory after joining the EU, is based both on the text of the Treaties and on the precedents of the EMU membership of Finland, Italy and Greece. We do not argue that a waiver of or derogation from ERM membership is required. That would imply that the Maastricht Treaty and Protocols formally require two-year ERM membership prior to EMU membership. They do not. What they do require is the *observance of the normal fluctuation margins provided for by the exchange rate mechanism of the European Monetary System*, which is not the same thing. This is consistent with 'shadowing' the ERM without being a member (21).

20) If a country were to join EMU with its inflation rate above its long-run EMU rate of inflation, it would, if there is inflation persistence across monetary regimes, raise the average rate of inflation of the enlarged EMU. With an unchanged EMU-wide inflation target, the existing EMU members would have to achieve a somewhat lower rate of inflation. Since all accession candidates are economically very small, this 'externality' is very small indeed.

*21) The third indent of Article 109j(1) of the Treaty refers to the exchange rate criterion as: "*The observance of the normal fluctuation margins provided for by the exchange-rate mechanism of the European Monetary System, for at least two years, without devaluing against the currency of any other Member State;*" Article 3 of Protocol No 6 specifies that: "*The criterion on participation in the exchange-rate mechanism of the European Monetary System referred to in the third indent of Article 109j(1) of the Treaty shall mean that a Member State has respected the normal fluctuation margins provided for by the exchange-rate mechanism of the European Monetary System without severe tensions for at least the last two years before the examination. In particular, the Member State shall not have devalued its currency's bilateral central rate against any other Member State's currency on his own initiative for the same period."

There are also precedents that support the view that the exchange rate criterion can be satisfied without the candidate country being an ERM member. Italy and Finland joined EMU at its start, on January 1, 1999, even though at the time the decision to admit these two countries was made, they had not yet spent two years in the ERM.

This tension is clearly reflected in the language used in the Commission's Convergence Report: "*Although the lira has participated in the ERM only since November 1996, it has not experienced severe tensions during the review period and has thus, in the view of the Commission, displayed sufficient stability in the last two years.*" (European Commission [1998, p24]) (22). This assessment was made in March 1998.

There can be no doubt that, if the exchange rate criterion for EMU membership does indeed require a candidate country to be a formal ERM member, then this criterion was interpreted extremely generously, for Italy and Finland (and later for Greece). The only way it can be argued that both the letter and the spirit of the Treaty and Protocol were respected by the Commission and the EMI (and subsequently by the Council) is by accepting that the exchange rate requirement can be met as long as the ERM fluctuation margins have been respected, regardless of whether or not the candidate country was formally an ERM member.

The only substantive argument against immediate EMU membership for all new EU members is the current constitution of the ECB's Governing Council. The solution is surely reform of the ECB, rather than delay EMU membership.

Since the Treaty does not require that a candidate for EMU must also be an EU member during the two years that it has to observe the ±15 percent margins, there would seem to be no reason why the flexible interpretation applied to Italy and Finland could not be extended to accession countries to allow them, in principle, to become EU and EMU members at the same time, or with minimal delay.

There is a view in Frankfurt and Brussels which supports the "hard ERM" approach for prospective EMU members: That is two or more years of formal ERM membership following EU accession. Associated with this view is a preference for a post-EU entry exchange rate that floats within a target zone with symmetric 15 percent bands. Inflation targeting (with the target inflation rate low enough to meet the inflation criterion for EMU membership), subject to the exchange rate target zone constraints, appears to be the recommended nominal anchor.

Even in Brussels and Frankfurt, the support for the "hard ERM" view is not unanimous or unqualified. There is widespread awareness that inflation targeting, even when pursued competently, does not rule out either a highly volatile exchange rate or persistent, medium-term misalignments. Also, the inflation criterion of the Maastricht Treaty is a 'raw' consumer price index (the HICP), with no allowance for difference between actual and 'core' inflation, between transitory and permanent changes in the inflation rate or between inflation in traded goods prices and in non-traded goods prices. A sensible inflation target, chosen to deliver smooth convergence when EMU membership is achieved would also have to allow for persistent equilibrium inflation differentials - but that is not what is specified in the Treaty.

More generally, the history of the pursuit of two nominal targets (or one nominal target subject to a nominal constraint) is not a happy one. The history of exchange rate target zones under

22) See also European Monetary Institute (1998). This was also published in March.

unrestricted financial capital mobility is an especially unhappy one (see for example Buiter, Corsetti and Pesenti, 1998). Accession candidates wishing for early EMU membership should not have to spend two or more years in this unnecessary and uncomfortable purgatory.

In our view, the only substantive argument against the earliest possible EMU membership for all accession candidates who qualify for EU membership is that the current constitution of the ECB's Governing Council (a six-member Executive Board plus the national central bank governor of each EMU member state) and its current voting procedures (equal weight for each Council member) would become unmanageable with an additional eight to ten members. We share these concerns, but the solution is surely to reform, before 2004, the composition and voting procedures of the Governing Council of the ECB, rather than to delay the EMU membership of the successful EU accession candidates.

References

Buiter, W.H., Corsetti, G. and Pesenti, P.A. (1998). *Financial Markets and European Monetary Integration; The lessons of the 1992-93 Exchange Rate Mechanism Crisis*. Cambridge University Press, Cambridge, UK.

Buiter, W.H. and Grafe, C. (2001). "Anchor, float, or abandon ship: Exchange rate regimes for the accession countries". Paper presented at the 10th Anniversary Conference of the EBRD, London, 13-14 December.

Calvo, G.A. and Leidermann, L. (1992). "Optimal inflation tax under precommitment: Theory and Evidence." *American Economic Review*, March, pp. 179-94.

Chang, R. and Velasco, A. (1998). "Financial fragility and the exchange rate regime." NBER Working Paper (6469).

De Broek, M. and Slok, T. (2001). "Interpreting Real Exchange Rate Movements in Transition Countries". IMF Working Paper (WP/01/56).

Della Paolera, G. and Taylor, A. (1999). "Internal versus external convertibility and developing country financial crisis: Lessons from the Argentinean bank bail out of the 1930's." NBER Working Paper (7386).

European Bank for Reconstruction and Development (2000). Transition Report, London, UK.

European Commission (1998). *Convergence Report* (prepared in accordance with Article 109j(1) of the Treaty), Brussels, March.

European Monetary Institute (1998). *Convergence Report*. Report required by Article 109j of the Treaty establishing the European Community, Frankfurt am Main, March.

Ghosh, A.R., Gulde, A.M. and Wolf, H.C. (2000). "Currency boards: more than a quick fix". *Economic Policy* (31), pp. 271-335.

Heston, A., Nuxoll, D.A. and Summers, R. (1994). "The Differential-Productivity Hypothesis and Purchasing-Power Parities: Some New Evidence". *Review of International Economics*. 2(3), pp. 227-43.

Jakab, M.Z. and Kovacs, M.A. (1999). "Determinants of Real Exchange Rate Fluctuations in Hungary". National Bank of Hungary Working Paper.

Pelkmans, J., Gros, D. and Nunez Ferrer, J. (2000). "Long Run Economic Aspects of the European Union's Eastern Enlargement". Scientific Council for Government Policy, WRR, Working Paper (109).

Rother, P. (2000). "The Impact of Productivity Differentials on Inflation and the Real Exchange Rate: An Estimation of the Balassa-Samuelson Effect in Slovenia". IMF Staff Country Report (00/56), pp.26-38.

Samuelson, P.A. (1994). "Facets of Balassa-Samuelson Thirty Years Later". *Review of International Economics*, 2(3), pp. 201-26.

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